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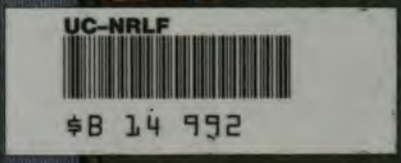

of Proceedings

of the

American Mining Congress

Eighteenth Annual Session

San Francisco, California, September [illegible], 1915

Published by The American Mining Congress
At the Office of the Secretary, Washington, D. C., 1915

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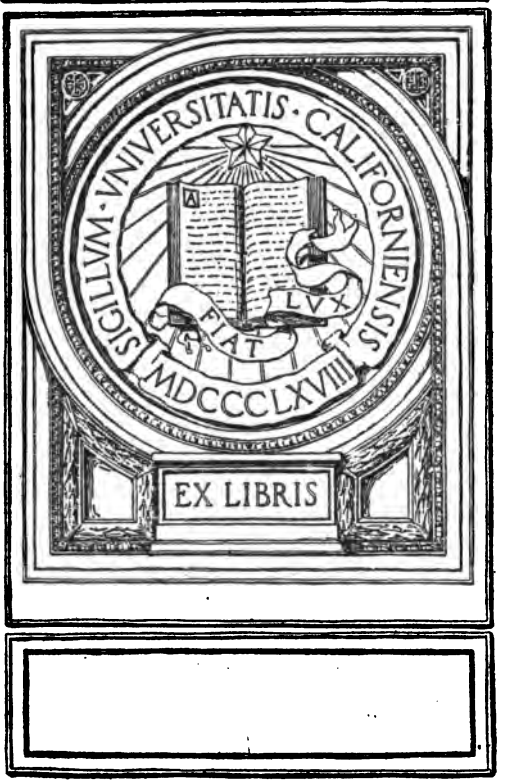

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Report of Proceedings

of the

American Mining Congress

Eighteenth Annual Session
San Francisco, California
September 20-22, 1915

Published by The American Mining Congress
At the Office of the Secretary, Washington, D. C., 1916

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1915

PREVIOUS SESSIONS OF CONGRESS

	DATE.		CITY.	PRESIDENT.	ADDRESS.
1st	July,	1897*	Denver, Colo.	Hon. Alva Adams,	Pueblo, Colo.
1st	July,	1897	Denver, Colo.	Hon. L. Bradford Prince,	Santa Fe, N. M.
2d	July,	1898	Salt LakeCity,Utah.	Hon. L. Bradford Prince,	Santa Fe, N. M.
3d	July,	1899†	Milwaukee, Wis.	Col. B. F. Montgomery,	Cripple Creek, Colo.
3d	June,	1900	Milwaukee, Wis.	Col. B. F. Montgomery,	Cripple Creek, Colo.
4th	July,	1901	Boise, Idaho.	Hon. L. Bradford Prince,	Santa Fe, N. M.
5th	Sept.,	1902	Butte, Mont.	E. L. Shafner,	Cleveland, Ohio.
6th	Sept.,	1903	Deadwood and Lead, S. D.	Hon. J. H. Richards,	Boise, Idaho.
7th	Aug.,	1904	Portland, Ore.	Hon. J. H. Richards,	Boise, Idaho.
8th	Nov.,	1905	El Paso, Tex.	Hon. J. H. Richards,	Boise, Idaho.
9th	Oct.,	1906	Denver, Colo.	Hon. J. H. Richards,	Boise, Idaho.
10th	Nov.,	1907	Joplin, Mo.	Hon. J. H. Richards,	Boise, Idaho.
11th	Dec.,	1908	Pittsburgh, Pa.	Hon. J. H. Richards,	Boise, Idaho.
12th	Oct.,	1909	Goldfield, Nev.	Hon. J. H. Richards,	Boise, Idaho.
13th	Oct.,	1910	Los Angeles, Cal.	Dr. E. R. Buckley,	Rolla, Mo.
14th	Oct.,	1911	Chicago, Ill.	John Dern,	SaltLakeCity,Utah.
15th	Nov.,	1912	Spokane, Wash.	Samuel A. Taylor,	Pittsburgh, Pa.
16th	Oct.,	1913	Philadelphia, Pa.	David W. Brunton,	Denver, Colo.
17th	Dec.,	1914	Phoenix, Ariz.	Carl Scholz,	Chicago, Ill.
18th	Sept.,	1915	San Francisco, Cal.	Carl Scholz,	Chicago, Ill.

*Temporary.
†Passed to June, 1900.

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OFFICIAL CALL

Mining is essentially a National Business. While composed of many units, it is necessarily a big business. Co-operation of those units is essential to the highest efficiency. Safety, Efficiency and Conservation can only be accomplished through the combined efforts of operator, miner and consumer. The careful deliberation of practical mining men is essential in the solution of the growing problems of the industry. An opportunity for discussion and the outlining of plans through which better conditions may be brought about, will be given

At the

EIGHTEENTH ANNUAL SESSION

Of the

AMERICAN MINING CONGRESS

Which is Hereby Called to Meet at the

Exposition Memorial Auditorium

San Francisco, California

September 20, 21, 22
1915

REPRESENTATION

The Convention will be composed of the active and associate members of The American Mining Congress and members of affiliated organizations, specially invited guests and duly accredited delegates appointed under the authority hereby extended for the appointment of delegates, as follows:

The President of the United States may appoint ten delegates at large;

The Chief Executives of foreign nations may appoint ten delegates;

Governors of states and territories may each appoint ten delegates;

Mayors of cities and towns, two delegates each and one additional delegate for each 100,000 of population;

Boards of County Supervisors, Boards of Trade, Chambers of Commerce, Mining Bureaus and Exchanges, Mining Organizations, Scientific Societies, Engineers' Associations, and State Mining Schools may appoint two delegates each.

The early appointment of delegates is specially urged and that the name and address of each delegate appointed shall be sent the Secretary at the earliest time possible. Delegates will be advised of the subjects to be presented in order that proper preparation may be made for discussion.

THE AMERICAN MINING CONGRESS,
By order of the Executive Committee,
CARL SCHOLZ, President.

Attest:
J. F. CALLBREATH, Secretary.
Majestic Bldg., Denver, Colorado, May 31, 1915.

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Second Vice-President—M. S. KEMMERER.
Third Vice-President—JAMES E. TALMAGE.

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C. T. Brown.....Socorro, N. Mex.
Isadore Broman.....Austin, Tex.
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NOTICE OF ANNUAL MEETING OF MEMBERS.

A meeting of the active members of The American Mining Congress is hereby called to meet at the Exposition Memorial Auditorium, San Francisco, Calif., September 21, 1915, at 7:30 p. m., for the purpose of electing six directors; one director to serve for a period of one year to fill vacancy and five directors to serve for a term of three years, to succeed Mr. D. W. Brunton, Mr. George H. Dern, Mr. Falcon Joslin and Mr. Harry L. Day, whose terms of office expire, and for the transaction of such other business as may be properly brought before said meeting.

THE AMERICAN MINING CONGRESS,
By order of Executive Committee,
CARL SCHOLZ, President.

J. F. CALLBREATH, Secretary,
Denver, Colorado, May 31, 1915.

NOTE—The American Mining Congress is an incorporated body and only active members of the organization can legally vote upon such matters as relate to the permanent business affairs of the Congress, the control of which is lodged in a Board of Directors consisting of thirteen members, who are elected to hold office for three years.

The Board of Directors is largely guided by the resolutions adopted by the Congress in Annual Session, and will maintain a working force continually engaged in carrying out the directions of the Congress.

In the regular deliberations of the Congress, the introduction and discussion of resolutions and other matters, serving upon convention committees, and in every phase of the meeting of the open body, the rights, duties and privileges of the regular members of the American Mining Congress and those of the duly appointed and admitted delegates are the same in all respects.

GENERAL STATEMENT.

(The following statements are suggestive only, are offered as the thought of the Secretary and do not assume to represent the judgment of the members of the organization nor to place a limit upon the action of the convention.)

Convention Plan.

It is planned to so limit the sessions of the convention that delegates and members may have greater opportunity for attending the Panama-Pacific Exposition. The usual addresses of welcome and responses from the representatives of the several states will be limited to one hour. The papers to be considered by the convention will be printed and distributed to the delegates before the convention and discussion of these papers and the subjects presented will be limited as the convention may direct. Instead of assigning certain times for the discussion of the several subjects a general program will be outlined, and at the first meeting the convention will decide how much time shall be given to the discussion of each subject.

Western Mining.

Discussion looking to the better development of Western mining ought naturally to take precedence in a Western convention. How to make mining more profitable, by more efficient mining methods, more effective treatment processes, or a better market for the product, are fundamental questions submitted for discussion.

Gold Mining.

Modern business enterprise depends largely on bank credits which are limited ultimately by the gold reserves. Gold reserves remain practically constant without reference to the enormous war destruction of fixed capital and property, and the demand upon floating capital for other than industrial purposes. To replace the present appalling waste will call, the world over, for increased constructive power, increased business enterprise and an increased burden on gold reserves, which, to the extent that the business world comprehends basic conditions, will create an increased interest in gold mining.

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Mining Investments.

Every increase of western mining development so directly benefits the West as to justify every possible effort to guide investors into channels which give fair promise of satisfactory results. A mining enterprise, unsuccessful as the result of rascality, blocks the way to future investments and injures both the investor, the community which suffered the fraud and every other community needing capital. A great comprehensive movement is being planned by which the state chapters and local sections of the Mining Congress may co-operate with the National Organization in attracting attention to promising opportunities, give accurate and reliable information to all intending investors, and protect them against all but the inherent risks of mining.

Mine Manufacturing.

To advertise the mineral resources of the West, to demonstrate the necessity for the development of new mines for the employment of the brains, capital and labor now employed in mines which are being steadily exhausted, and to meet the increased demand for gold in the world's commerce—offers a promising field of public service and private gain to the prospector, the engineer, the promoter and the investor.

The Prospector, the Promoter and the Engineer.

The prospector whose patient search calls attention to the possible mining opportunity, the engineer who justifies and plans for the investment, the promoter who secures the money, the mine manager and superintendent who supervise the operation, must each be given sufficient incentive to justify the best work. To the extent that any of these separate callings are uncertain of reward, to that extent must increased returns be promised in order to justify the risk of the undertaking.

The prospector upon the public domain should have a certain promise of satisfactory title to any claim he may undertake to develop and any question of his right to secure title will necessarily interfere with his willingness to prospect or undertake development work.

The Public Lands Question.

Whether the Federal Government shall lease the coal, oil and phosphate lands and water powers, or whether these shall pass into private ownership and subject to the state taxing power, is a question of vital importance to the West.

As an illustration: The coal reserves of the State of Wyoming are estimated at 424,085,000,000 tons. Let us suppose that 25 per cent of this estimate is available for production. A royalty of 2 cents per ton to the Federal Government would amount to two billion dollars. If 10 per cent of the estimated coal were to be placed on the market during the next hundred years, it would mean at 2 cents per ton royalty, eight hundred million dollars—or eight million dollars annually, to be derived by the Federal Government from Wyoming, while Pennsylvania and the other great coal producing states of the East would go entirely free from paying similar tribute.

Ten per cent of the estimated coal reserve of the States of Wyoming, Montana, Colorado and Utah, at 2 cents per ton royalty, would net the Federal Government twenty-five hundred million dollars—one-third more than the aggregate bonded indebtedness of all the states and cities of the United States.

The water powers of the West are more valuable than its coal reserves, and a most modest royalty will net a fabulous income all of which will be a special tax upon the Western states for the support of the National Government, not imposed on the Eastern states.

This is one of the least important reasons why the West protests against the proposed leasing and water power bills.

The question is one which has direct bearing upon mining development and operation, and should receive the serious consideration of the convention.

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Conservation.

It is estimated that the available unused water power in the United States, without resort to storage is 66,518,500 h. p., that with storage 230,000,000 h. p. is possible. Less than 6,000,000 h. p. is developed and available for present use.

We are annually wasting about one-third of the coal reserves which are being exhausted. We are applying to beneficial use less than 10 per cent of the inherent possible value of the 500,000,000 tons of coal which is being consumed.

The creation of restrictions to coal mining and the hampering of development of water power under the guise of conservation is a travesty, while the development of resources and the prevention of present waste, is real conservation. Under this head a discussion of the probable effects of the proposed federal leasing system will be presented.

Revision of Mineral Land Laws.

A bill for the creation of a commission to recommend to Congress such revision as may be needed in our mineral land laws after public hearings in the West, was passed by the last U. S. Senate, but failed to pass the House of Representatives. There seems a growing belief that the investigations of the proposed commission should include the questions involved in the leasing and water power bills, and that any legislation should include every phase of this subject and be enacted only after careful and thorough investigation.

Whether these questions should be treated as a whole or whether a patch-work system shall be followed, will justify a full discussion of the general subject.

Co-operation in the Coal Industry.

Destructive competition is one of the controlling elements in creating an appalling condition in the bituminous coal industry. First, 2,500 lives are sacrificed and more than 100,000 men are injured annually, in the coal industry.

Second, approximately 200,000,000 tons of coal are wasted annually, being sufficient to exhaust about 35,000 acres of our best coal lands.

Third, more than 500,000 workmen engaged in the bituminous industry are idle more than 100 days each year.

Fourth, more than $900,000,000 of capital engaged in the bituminous industry is idle more than 100 days each year.

The peculiar conditions surrounding this industry serve to aggravate these conditions which tend directly toward destruction of the small producers and the creation of a permanent monopoly in coal production. Complete co-operation between operator, miner and consumer is essential to the best results. The question is national, not local. It affects all of the people, not part of them. It is equally important to the coal consumer of the future and the operator of today. It is one of the vital public questions which need solution.

Co-operation which gives the workman a fair wage, the operator a fair profit and the consumer a fair price, should be made possible even though this may involve an enlargement of the powers of the Federal Trade Commission.

Discussion as to the best means of accomplishing these results will be welcome.

Coal Exports.

With the market price of coal lower than in any other large producing country, it would seem that export coals lying near the seaboard should absorb the trade of countries lying much nearer to us than to the countries which are now furnishing the larger part of the coal used. The Latin American countries during 1914, imported approximately $96,000,000 worth of coal, of which the United States supplied less than 25 per cent.

The Federal Trade Commission is especially authorized to investigate conditions in competing countries which permit trade combinations, but lacks authority to approve similar combinations, in order that the

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business of this country may be put upon an equal competitive basis. A discussion of the means through which our export trade may be so developed as to serve the public good, will be welcome.

Arbitration, Mediation and Conciliation.

The bitter feeling, the enormous destruction of property and, above all, the loss of life which has resulted from labor disputes should by some process be avoided without discouraging any proper effort by workmen to better their condition. The question is one which affects not only the parties involved, but the general public, in that every waste occasioned by strikes and lockouts must necessarily be paid for by some one, and usually by the consumer.

The enactment of the Clayton Bill by Congress, and the final adjudication of the Danbury-Hatters case are two notable recent happenings. The one intended to relieve labor entirely, from the provisions of the anti-trust laws, the other to fix a responsibility not theretofore generally recognized.

The American Mining Congress should be able to discuss the principles involved in good temper, with a view to meeting the just demands of both sides of such controversies.

In the discussion of this most important question it is hoped to lay the foundation for constructive effort.

Workmen's Compensation.

The reduction of the occupational hazards of mining to the minimum is a first duty. Second, it is important that proper provision shall be made for the widows and orphans of those whose lives are lost.

The great expense of conducting employers' liability insurance and the bad feeling which frequently grows from the settlement of losses under this plan, has led to workmen's compensation as a more satisfactory means. Workmen's compensation laws have been enacted in several states. In the making of these laws, efforts have been made to create conditions fair to both employer and employe. The experience under the operation of these laws should guide to more perfect enactments in such states as are yet to consider this subject. A report of our committee on workmen's compensation as a recommendation to other states will be considered.

Mine Taxation.

The many different rules applied to the taxation of mines is sufficient proof that most of them are not correct in principle. An effort looking to a uniform system of taxation where similar conditions prevail, to the extent that it is successful, will be of benefit to the mining industry. A further report of the committee on mine taxation will be presented for the action of the convention.

Metallurgical Research and Mine Safety Stations.

The enactment of the Foster Bill by the last session of Congress authorized the creation of ten metallurgical research and seven additional mine safety stations. The research stations are to be located in the metal mining sections, and are designed to find solution for the various problems of metal mining. A discussion of the means by which appropriations, to make this bill effective, may be secured from Congress will be welcomed.

Resolutions.

Any member of the convention may introduce resolutions upon any subject relating to mining. Resolutions are read to the convention and without debate referred to the Committee on Resolutions, composed of one member from each state represented in the convention, selected by the delegates in attendance from such states. Members desiring to introduce resolutions are requested to submit them in advance and the secretary will gladly lend assistance in putting the resolution in proper form for consideration.

Resolutions submitted in advance will receive the special attention of the Committee on Resolutions.

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REPORT OF THE PROCEEDINGS

OF THE

Eighteenth Annual Session of the American Mining Congress.

Civic Auditorium, San Francisco, California, September 20-22, 1915.

MONDAY, SEPTEMBER 20, 1915.

Opening Session.

10 O'clock A. M.

The Eighteenth Annual Session of the American Mining Congress was called to order in the Civic Auditorium at San Francisco, California, September 20, 1915, at 10 o'clock a. m., by Hon. H. K. Bassett, Assistant Director of Congresses of the Panama-Pacific International Exposition.

HON. H. K. BASSETT—Ladies and Gentlemen: I deem it a real privilege, friends, as Assistant Director of Congresses of the Panama-Pacific International Exposition, to be here this morning, and to call this Convention of the American Mining Congress to order. It is a privilege, because though you do happen to be one of something more than nine hundred different organizations which are to meet here during the Exposition period, we welcome you very sincerely and very earnestly. To be sure, the record for conventions during any one period in any one city has been so far eclipsed that the record has been quite lost track of, but it's not due to any single department, it's not due to any single group of people, it's due to the very earnest and hearty co-operation of people here in San Francisco, and the bay region, and the cordial assistance of the officers and members of the organizations themselves from all parts of this country that are meeting with us this year. It's a privilege, too, for me to be here, because of a very intimate and long continued correspondence that we have had with Messrs. Scholz and Callbreath, extending over a period of something more than two years. It's a privilege, also, because we can take some part in welcoming the new Director of the Bureau of Mines. It has been our privilege to come in contact with some of the other officers—Mr. Wilson, and those who have been here during the Exposition period; and that's the fine thing about our work in the Exposition—our particular department, because we are privileged to correspond with and to meet these people who represent so many human interests. And when I tell you that we have had contact with something like sixty-five hundred organizations, you will believe with me that man is an organizing animal! (Laughter.) We scratched the surface and reached something like sixty-five hundred of these organizations, and out of that number we have gathered unto ourselves here in San Francisco and the bay region over nine hundred conventions for the ten months' period. I want therefore very cordially, in behalf of the President and the Directors of the Exposition, and very intimately, in behalf of my colleague, Mr. James A. Barr, the Director of Congresses, to welcome the members of this Mining Congress, and in the same word to call the Convention to order, if I may, and present

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the President, who, of course, needs no presentation to you—Mr. Carl Scholz. (Applause.)

PRESIDENT SCHOLZ: Ladies and gentlemen, and fellow members of the American Mining Congress: We gladly receive the welcome extended to us by Mr. Bassett for the Exposition Association, and I want to say that, for the sake of brevity, the address which I have prepared has been printed and will be distributed; so we will not take up much of your time.

(The President's Annual Address will be found at page 98 of this report.)

There were just a few things I wanted to say regarding the accomplishments and the aim of the Congress with which you are already undoubtedly familiar, but there are so many subjects that are coming up now, that we hope you will carefully read all the papers that are to be presented and later put in printed form.

The main object of the Mining Congress is, of course, to organize the mining industry and bring its members into closer touch with one another. I think we are fortunate in having San Francisco as a meeting place this year, because so many men whom we could not possibly get together otherwise will be present here, and will tell us what the various states have done and are going to do.

I will now call upon a number of gentlemen who are here from the various states to respond briefly to the address of welcome given us by Mr. Bassett. I will first ask the Secretary to make a brief statement before I call on these other gentlemen.

MR. CALLBREATH: Mr. President and fellow members of the Convention: I want first to shy a little brick at our friend, Mr. Bassett, who has just been before you, because of the fact that the announcements that we have made as to the place of holding the Convention have stated it as it was officially given to us—"Exposition Memorial Hall." That is, as I understand it, the official title of this building, but up to this time there is no one in San Francisco who knows it, except Mr. Bassett. A number of people have said to me, "I thought the place of meeting was out in the Exposition grounds." This misunderstanding about the location of the building in which we have convened has undoubtedly prevented a number from being here for the opening session.

I want to say first that the early appointment of a Resolutions Committee is a very important matter. When we have a Convention extending over a period of five or six days, it is practicable to allow the appointment of that committee to be postponed until after the opening session, but as our Convention this year is confined to three days, and to less than one-half the ordinary number of sessions, it will be necessary that the Resolutions Committee be selected at the earliest time possible. Our By-Laws provide that the Resolutions Committee shall be named by the delegations from the several states, so that the appointment of the Resolutions Committee is entirely beyond the control of the organization, and left entirely to the delegates who attend the Convention. The purpose is that we may get the best thought of those who are not directly working with the organization and come here as delegates. Will each state delegation, therefore, arrange at the earliest time possible to select the man whom they will ask to serve as a member of the Resolutions Committee?

Let me say further that all resolutions, according to our By-Laws, must be submitted in writing, and referred to the Resolutions Committee without debate, and that every member of the Convention is privileged to introduce any subject to the Convention which he desires by means of a resolution.

I hope that the important matters which are vital to the further progress and development of mining will be presented by those of you who know what those problems are, and I am sure the things for which you ask redress will receive the best attention of the Convention.

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The American Mining Congress is, first of all, an organization to get things done. We leave the scientific matters for scientific organizations and devote ourselves to the accomplishment of certain purposes. The organization is guided throughout the succeeding year by the resolutions of the Convention. We hope, therefore, that these resolutions offered will be representative of the best thought of the mining industry at this time.

PRESIDENT SCHOLZ: Gentlemen, do not forget to select your members of the Resolutions Committee at the earliest time possible.

I will now call on Professor Charles F. Willis, Tucson, Arizona, Director of the Arizona Bureau of Mines, to respond to the address of welcome.

PROFESSOR WILLIS: Ladies and gentlemen: Arizona wishes to extend its greetings and best wishes to the American Mining Congress, to the State of California and to the City of San Francisco.

Arizona owes much to the American Mining Congress. Nine months ago there were but fifteen members in the Mining Congress from Arizona; now there are almost 500. Inspired by the meeting in Phoenix during last December, the Arizona Chapter of the American Mining Congress was organized, and is rapidly growing. This Chapter has been extremely active; it has prevented a great deal of seemingly detrimental legislation; it has brought about a friendly feeling among the mining companies; it has shown the business man his real relation to the mining industry, and it has demonstrated to the farmer the value of co-operative upbuilding. It has assisted the School of Mines by greatly increasing its appropriations and has been instrumental in the organization of the State Bureau of Mines. An immense amount of work has been accomplished in nine months, and we have a lot of boosters in Arizona who are going to push it right along (applause) and who are going to stay with it. We are going to make the Arizona Chapter known from one end of the country to the other.

The state again extends its greetings.

PRESIDENT SCHOLZ: When we were at Phoenix last year—and, incidentally, it is quite gratifying to know that we accomplished something—there was one man there who told us a great deal about Texas. Most of us who live in the East look upon Texas as the home of the long-horned cattle, and do not know much about the mining industry down there, but this gentleman made us believe the state produced everything from gold to diamonds. But it would seem that this gentleman, after he had made this great and glowing talk, felt that after all he could not deliver the goods in Texas, so he moved to Colorado, because Colorado was a mining state. The gentleman I refer to is Dr. Phillips, the President of the Colorado School of Mines, who will now speak to us. (Applause.)

DR. WILLIAM B. PHILLIPS: Mr. President and fellow members: It is true that we told the most awful lies last year at Phoenix! (Laughter.) One gets in the habit of doing so out in that southwest country, and I have known very few men even of my age—and my years go back now to the Civil War period—who can live in the southwest and continue to tell the truth. (Laughter.) That's especially true in the great old State of Texas, and I will admit that I did tell some dreadful stories at Phoenix last year! (Laughter.) And the President is perfectly right in saying, finding myself unable to "deliver the goods" I went into a state where there are bigger liars than in Texas! (Laughter.) Mark Twain once defined a mine, you know, and I have thought that his definition ought to be in the dictionaries. Mark's definition of a mine was about to this effect, that a mine is "a hole in the ground, owned by a liar!" (Laughter.) And he went on further to say that a lie was "an abomination in the sight of the Lord," and "a very present help in the time of trouble!" (Laughter.) I have so recently removed from Texas to Colorado that I am unable to respond for the State of Colorado as its importance deserves. I can only give to the American Mining

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Congress the sincerest greetings from that commonwealth, with the hope that its next meeting, or certainly one of its succeeding meetings, shall be held in the City of Denver.

I have recently moved into that state to take charge of the Colorado State School of Mines, and I am sure it will give us a great gratification if every member of this Mining Congress should come there to see it, and I am sure we would welcome this entire Congress, and see that all the facilities of that great state and of that school were offered to them.

It is quite impossible to speak at length on the State of Colorado to the American Mining Congress in the space of two minutes. I have already exceeded that time, and I am greatly obliged to you for the very patient attention you have given to this little lie of mine! (Laughter and applause.)

PRESIDENT SCHOLZ: We have with us this morning one miner of the old school. I refer to Mr. Gardner F. Williams, of Washington, D. C., who will respond for the District of Columbia. (Applause.)

MR. WILLIAMS: Mr. Chairman, ladies and gentlemen: I came here with no idea of speaking. I received a card yesterday saying that the members of this Congress would extend to me all the privileges of a delegate if I would attend its meetings, and I have come here in response to that invitation.

I do not represent the District of Columbia as an official delegate, although I reside there.

There are quite a large number of delegates here from the Geological Survey and the Bureau of Mines, and I should have been more pleased if one of these gentlemen had been asked to respond for the District of Columbia and I had been asked to speak on some subject connected with my work as a mining engineer, which dates back to the old school, as President Scholz has said.

I was graduated in 1865 at the College of California in Oakland, which was the predecessor of the present university. I took a post-graduate course of three years in mining and metallurgy at the Royal Mining Academy at Freiberg, Saxony. At that time the courses of lectures were given by some of the ablest men, then known in Europe, on the various subjects taught on mining and metallurgical engineering. But long before those men were lecturing to the students at the Freiberg Academy, in fact, it was about the middle of the Sixteenth Century, a book on mining and metallurgy was written by Agricola and published in Latin. There is also an old German translation of this wonderful book, I believe—and today, if you will read the Agricola that our friends Mr. and Mrs. H. C. Hoover have translated from the Latin into English, and which contains all the quaint illustrations of the original book, you will find therein many illustrations and descriptions of mining and metallurgical processes that are similar to those employed at the present time.

But I do not go back as far as Agricola's time in my experience. (Laughter.)

I returned to California after completing my studies at Freiberg and for sixteen years was actively engaged in mining in several states on the Pacific coast.

In 1884, I was appointed general manager of an English company engaged in mining for gold in the northern part of the Transvaal Republic, South Africa.

On my return voyage to England I met Cecil Rhodes and, as the voyage lasted eighteen days, we became well acquainted.

I returned again to South Africa at the end of 1886 and met Mr. Rhodes again while passing through Kimberly. After a few days' stay at Kimberly, I proceeded to the Transvaal to carry out instructions of the Exploration Company, Ltd., of London, in whose interests I had gone to South Africa. Later, at Mr. Rhodes' request, my engagement with this company was cancelled by mutual consent, so that I might take over the management of the DeBeers Mining Company.

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The story of the great diamond mines would fill volumes, but suffice it to say on this occasion that when I took charge of these mines nearly all the work was being done in the open and it fell to my lot to develop them, by sinking vertical shafts, equipped with modern machinery. The growth of the improvements in machinery may be best realized by stating that the largest engine at the DeBeers mine was only forty horsepower when I assumed charge in May, 1887, and that today there are probably twenty engines, ranging from 2,000 to 5,000 horsepower at the five mines. In 1907, the company employed over 4,000 white men and 27,000 Kaffirs. At the end of the fiscal year, June 30, 1914, there were 2,963 white men and nearly 17,000 Kaffirs employed. The amount of diamond-bearing ground hoisted from DeBeers and Kimberly mines for the fiscal year ending March 31st, 1889, was 755,760 tons. These were the only mines worked by the DeBeers Company during that year. The output from three of the company's mines, exclusive of those mentioned above, during the year ending June 30th, 1914, was 7,067,000 tons. The revenue for the same period was £5,850,000 (over $28,000,000), out of which dividends amounting to £2,050,000 were paid.

I have always felt that one owes much to the community in which one lives. Mining towns are dependent on the mines for nearly everything, and in South Africa there is no exception. Fortunately, we had Cecil Rhodes at the head of DeBeers Consolidated Mines, to whom, in a great measure, credit for the comforts of the employes of DeBeers is due, but I may add all the directors and those connected with the management of the company gave him loyal support in his effort to make the employes and their families happy and contented.

It was a pleasure to manage a company of this magnitude, employing during my time over 3,000 white men and 20,000 natives, all satisfied with their work and the remuneration they received. It was always the aim of the managers to deal with the employes in a friendly manner, to listen to their grievances, if they had any, and give their requests due consideration. The results were that strikes were never thought of, much less carried out.

I have already said that one owes something to the community in which one lives. Personally, I felt the necessity of doing something for the benefit of the boys who wished to study mining engineering. While engaged in carrying on the great work entrusted to me, I was instrumental, with the assistance of others, in getting a grant from the government of the Cape Colony and from DeBeers Company sufficient to erect buildings and get the necessary equipment for a School of Mines, and in addition to this to get money enough to pay the teaching staff. This school prospered, but it had its troubles, the greatest of these being the Boer War.

A good sound mining education was given to a large number of young men at Kimberly and was discontinued only when those interested in mining at Johannesburg subscribed £100,000 (about $500,000)—you know that is a great deal of money—and when the Transvaal Government contributed an equal amount for a School of Mines at Johannesburg—and better facilities for teaching were established there.

During the years I was absent from California I kept in touch with its university, my Alma Mater, and more especially with the Department of Mines.

In 1910 I was honored by having the degree of Doctor of Laws conferred on me by the university.

In conclusion, I will only add that I feel guilty of having digressed from the subject on which the Chairman said I would respond, namely, for the District of Columbia, but this District is represented here by the Directors of the U. S. Geological Survey and the Bureau of Mines, and by other gentlemen who have resided there for many years and who are better able to tell you of the beautiful City of Washington and its surroundings than I, a resident of only a few years, could possibly describe to you.

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I have lived up to what I think a good citizen owes to the community in which he lives. I was Acting President of the University Club of Washington for nearly a year, owing to the illness and death of the late Senator Elkins, and President of the club for two years following, during which the plans for the present clubhouse were perfected and the building was completed.

The Directors of the Emergency Hospital Board of Washington completed a hospital building during the present year and it now stands as a monument to those who contributed so liberally to the building fund and a blessing to all who come within its doors. I am proud to have been a member of the Board during the greater part of the time I have resided there, and to feel that during that time I have assisted in the completion of this hospital.

As an old resident of California, I wish to join with other members of this state in giving you a hearty welcome here. (Applause.)

PRESIDENT SCHOLZ: There is a gentleman in this room who took his life in his hands by coming with me on this trip. I have known him for a number of years, but I have come to know him better during the last four days. In addition to the pleasure of visiting with him during the course of our regular schedule in coming westward, our visit was prolonged by a railroad accident which delayed us and gave us four more days together. I am going to call on Mr. John P. Reese of Gillespie, Illinois, to respond for his state. (Applause.)

MR. REESE: Mr. Chairman, ladies and gentlemen: I feel wholly unprepared to represent the State of Illinois at this Mining Congress. I consider that Illinois, having contributed the President to this gathering, has already done her full duty. It would seem also that I have contributed my share by helping to take care of the President on the trip from Chicago to Frisco. (Laughter and applause.) We had a very pleasant journey, being only twelve hours late, and encountering a few other things, but I am like the boy at the taffy pulling—I am glad I'm here. I came to look and listen and not to talk or attempt to teach.

I had the pleasure of attending a mining congress as a representative of the State of Iowa some fourteen years ago over at Boise, Idaho. I always regretted that I did not go through to the coast at that time. This is my first trip to the coast, and so far I am very well impressed, and I hope that the Mining Congress will be a howling success. It's pretty far from the coal mines of Illinois, and I do not expect to meet many of my "coaleagues" here! (Laughter.) But the President being a miner and from the State of Illinois, we feel that Governor Dunne is properly taken care of and Illinois sufficiently represented without any address of welcome or response to an address of welcome from me. I thank you very much. (Applause.)

PRESIDENT SCHOLZ: I am told that death and taxes are two things that none of us can escape. I have learned a good deal about taxes, because in our district the taxes have recently been raised, and it took almost all of my worldly possessions to pay my tax bill this season, and it's just by the narrowest margin that I am able to come here. There is a man here who knows all about the raising of taxes, and I am told—in fact, I know from experience—that he is an expert at it. However, I am going to let you judge for yourselves by calling upon Mr. R. C. Allen to tell us how they raise taxes in Michigan, and what he thinks of San Francisco and the Fair. (Applause.)

MR. ALLEN: Mr. President and gentlemen: I come to you from Michigan, the place to which the President refers, where taxes, as well as other valuable products, are "raised." I bring to you a word of greeting from the Governor, the mining men, and the people of Michigan. My instructions are to attend the sessions of the Mining Congress and to gather up all of the ideas and information that are produced which may be of use or value to the State of Michigan. That's why I am here.

It has been my good fortune to attend four or five of the annual meetings of the Mining Congress. These meetings are an inspiration.

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Here we meet old friends and make new ones, and gather new ideas and new experiences. I am sorry that Michigan is not better represented here, both in numbers and in the personnel of its representatives. But please do not measure the interest which Michigan has in the Mining Congress and the welfare of the mining industry by the size of its delegation. Michigan is very much interested in the work of the Mining Congress and with all that has to do with the mining industry.

My friend from Arizona has referred to the value of last year's meeting of the Mining Congress to the mining industry of Arizona. I heartily hope that the Mining Congress will come to Michigan some time in the near future. It may do us an equal amount of good.

One of the things that the Congress—the Mining Congress—has done, one of the things that deserves the support of all of us who are in the mining industry, or who are allied with the mining industry, is the publication of the journal which I hold in my hand. Only a few numbers have been issued. I trust that all of you are familiar with it. It is a journal that is filling a very great need throughout the country, and I think that our Secretary is to be congratulated on the magnificent journal that he is now publishing. I thank you. (Applause.)

PRESIDENT SCHOLZ: There is a gentleman in this room who comes from a state where they say, "You have got to show me!" I refer to Mr. Otto Ruhl, of Joplin, Missouri, who has charge of the Missouri exhibit at the Fair, and who can give us pointers on what we will see and what we have missed by not being here sooner. (Applause.)

MR. RUHL: Mr. Chairman, ladies and gentlemen and friends: It certainly gives me a great deal of pleasure to be at these meetings of the American Mining Congress, and I certainly am very glad to be here in the position of host as well as delegate, because I want to invite every member who is a visiting delegate and all of their friends to be at the mining building as much as they possibly can during this week. We have done all we can to make it pleasant for you and hope you will enjoy yourselves. We want you to "go the limit" while you are here with us.

With regard to the Mining Congress itself, I have had the pleasure of being at several of the meetings. At none of these have I had greater pleasure, of course, than the one in my home town, Joplin.

The Joplin district owes a great deal to the American Mining Congress, and I wish to pay tribute at this time to the things it has done for us, and we hope in some measure at some time to repay those things in the support we may give the American Mining Congress. We are of course facing a great many of the same problems in much the same way that we have faced our problems in the past, and the American Mining Congress, I am sure, will contribute to their solution in like measure and will assist in successfully meeting all those issues which we will be compelled to face in the very near future. At this session of the American Mining Congress I hope that we will be able to get a closer affiliation of the various mining interests and look at our problems more from a national standpoint.

In this connection, like Mr. Allen from Michigan, I feel that we are going to have a great deal of assistance through the publication of the new journal which is being put before us by the American Mining Congress. I have read with a great deal of pleasure the numbers that have been published, and I have already seen the seeds that were being planted for a great harvest in the future.

We have all been negligent, we have all been indifferent to the national legislation that is being carried on in regard to our mining interests, and by reading the new journal I am sure we will be enlightened and will be able to take care of our interests in better shape than hitherto. (Applause.)

PRESIDENT SCHOLZ: Mr. Harry L. Day, Vice President of the American Mining Congress, and a resident of the State of Idaho, will respond for his State.

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MR. DAY: I beg your pardon, Mr. President, I did not hear you exactly.

PRESIDENT SCHOLZ: I called on Mr. Day to respond for his state. Do you hear it now? You heard me the first time, I think. (Laughter.)

MR. DAY: Yes, I got you, Mr. President.

MR. DAY: Mr. President, ladies and gentlemen: I just got in and took a rear seat and did not understand there were going to be any speeches made this morning. I have not been on a program for a long time. We have not much to report, unless it be that we have been working so hard this year trying to get the high prices for zinc and copper and lead and other trifles of that sort that we have not had much time to do anything else. But we can simply report progress all along the line, and say that we are busy. A number of our prominent mining people are in the city, I believe, and I think more will be here during the day, so that we will have a representative delegation. We shall be very much interested, as usual, in all the affairs of this Congress. (Applause.)

PRESIDENT SCHOLZ: Mr. George H. Utter, of Silver City, will respond for the State of New Mexico.

MR. UTTER: Mr. President, members, ladies and gentlemen: It is quite unexpected on my part that I am called upon to respond for New Mexico to the address of welcome. My work is not usually in the line of public speaking.

New Mexico extends greetings to San Francisco. We rejoice that we as a state and people exist at this time, thus enabling us to see your city in its beauty and the fullness of its glory. We congratulate you upon the creation and management of the Panama-Pacific Exposition, the greatest of its kind in the history of the world, and probably the greatest the world will have during the next 500 years.

New Mexico covers 122,000 square miles, bounded on the north by Colorado, on the east by Oklahoma and Texas, on the south by Texas and Mexico, and on the west by Arizona. What the heart is to the body, New Mexico is to this great and wonderful southwestern country, with a climate unexcelled in any part of the world and which, owing to its various altitudes, fits every condition that humanity demands. As a herding and grazing country, the year round, it cannot be excelled. As a farming and fruit-growing country it is just beginning to come into its own. Our apples have the flavor of the New York and Michigan varieties. The coal mines of the north and central New Mexico can supply the world as long as coal is in demand. Its iron, copper, gold and silver mines have been producing profitably on such a large scale for so long a period that it is a waste of your time to tell you about these resources that are now recognized as being practically unlimited. We have a spot cash market for everything we can raise.

All these have brought New Mexico strictly to the front as a legitimate producer. There is one crop, however, that we don't want, and that is the sucker crop; we pass that on. We feel that one man who spends his money and does not get a return therefor is a detriment to the country. We want to see results in everything, and we desire that good results be produced by everybody that comes to New Mexico. I thank you.

PRESIDENT SCHOLZ: On my way West, I stopped at a city by the Great Salt Lake, and I found that the very man I looked for had already gone, but he turned up this morning at the Convention, and I am going to call on Dr. James E. Talmage to speak for the State of Utah. (Applause.)

DR. TALMAGE: Mr. President, delegates, members, and all: I thought my cup of satisfaction was full this morning when I realized that I would be able to reach San Francisco in time to be present at the opening session of this Congress. The honor of addressing you I had not expected to receive, but in responding to the very hearty welcome that has been extended to me by the representative of the great Panama-

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Pacific International Exposition, I feel that I can safely express unbounded satisfaction and appreciation in behalf of the people of the State of Utah, of the many hundreds of great national and international gatherings that have been held in this city in connection with the Exposition thus far. This is the third which I have had the pleasure of attending, and in the proceedings of which I have participated, and I know therefore by experience what the hospitality of San Francisco and of the Exposition and of the great State of California means.

The work of the Mining Congress has appealed to me from the beginning of the history of the organization, and fearing that perhaps taxes would be raised, I took occasion early in its history to become a life member! (Laughter.) And so be exempt from any increase in levies for the operation of the Congress! (Laughter and applause.)

The people of Utah, and particularly those of Salt Lake City, sometimes refer facetiously to San Francisco as one of our suburbs with a few hundred miles of desert and sand in between, and we run down into the suburbs when we want to enjoy ourselves in any way out of the ordinary! (Laughter.) We are here to take part with you in the proceedings of the Congress, in the spirit of the past sessions. The earnestness which has pervaded the proceedings in the past has appealed to me. The meetings of the American Mining Congress, and far back, when it was known as the International Mining Congress, have seemed to me to be working meetings. They have not been picnics nor mere excuses for outings, but every session, every gathering, has accomplished something. It's an organization with influence and prestige and the Government of the United States listens to its suggestions and its propositions.

In Utah, we are working heartily and unitedly for the further development and advancement of the mining interests. There Mormon, Gentile and Jew work together as brothers, and we have to get away from the state before we realize that some people think there are elements of disruption there operative. We work as one, and are busily engaged in developing the great resources of the state. I am limited to two minutes, and it would take me two years to fairly begin to tell you what those resources are. Therefore, I content myself with expressing with great earnestness the satisfaction I feel for myself and for the State of Utah in the great welcome that has been extended to us. (Applause.)

PRESIDENT SCHOLZ: You have noticed the embarrassment which I labored under when this Congress was opened, and after I finish these remarks you will see the reason. There is a gentleman in this room who served the Mining Congress for seven long years. Somewhere in the Bible there is a quotation that "there were seven fat years and seven lean years." The "seven fat years" are the period during which he served as President of this organization, and the "seven lean years" are just closing. I think there are "seven fat years" ahead of you. Before I came to the first meeting of the Mining Congress I had Mr. Callbreath send to me a full set of the annual proceedings, and I read with much interest the speeches or annual addresses of the Presidents for the purpose of drawing from them as much wisdom as I could absorb, and in them I have been amply repaid by reading the addresses of the gentleman I am going to call on next, because of all the clean-cut speakers—if there is such a word—Judge J. H. Richards, of Boise, Idaho, impresses me the best, and he is now going to address this meeting. (Applause.)

JUDGE RICHARDS: Mr. President and fellow members: I stand out, apparently, as the type of a fat man in the Congress. (Laughter.) I know I have grown somewhat fleshy—intellectually—by coming into contact with the men of this Congress during those "seven fat years" that were mentioned a while ago, but I do not express it very fully in my physical being as yet, and certainly I have never expressed it financially.

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At the beginning, as has been said, the Mining Congress was established or organized as the exponent of the great mining industry of this nation, because it reaches down into every fiber of American industry, underlying and forming a base for a large part of its development. It has produced some of the greatest characters that have lived in America, and I especially at this time appreciate the welcome that has been extended by California, because it was the gold that came from her soil that gave this nation one of her greatest inspirations and made it possible for us to develop the great industries that are established throughout this whole country. Those men who laid the foundation here in California, laid the legal foundation for the entire northwest. Our laws grew out of the customs that they established here, and through their great influence and that of the men that emigrated from here into the states of the whole western country, the nation received new inspiration. And yet at this hour, as you will hear before this Congress adjourns, the very policies that they established, and that gave us such grand possibilities as we have experienced, are undertaken to be perverted, as I understand. And it is a pleasure to be welcomed here at San Francisco, also, because our foundations rest upon the mining industry that our pioneers laid broad and deep; and no one can read the history of the mining industry of California without feeling that she has had one of the largest parts in making America what it is today. This Exposition shows the character of the men that are underneath it—nothing like it in the world. You will see nothing in the world such as you will see here. Look at this Civic Center where we stand. Everything you touch and that touches you seems to be an inspiration for something better, pleasanter and grander, and I am glad to come here at this time and have a part in this welcome from California.

Idaho hasn't done so very much in her ancient history. She has been producing a great deal of lead and other products. The gentleman who preceded me from Idaho is a type of the great miners of that state who are doing things up there, and who receive their inspiration from the men of California. It's almost overwhelming, and I suppose this thought will be intensified before I get through seeing the wonderful things in California, all of which received their inspiration originally through mining. I express the appreciation of Idaho for the men that California gives to this Mining Congress. (Applause.)

PRESIDENT SCHOLZ: Are there any other gentlemen who would care to make brief remarks? If so, we would be glad to hear from them. If there are not, Mr. Secretary, have you anything to bring before this meeting? Are there any communications to be read?

SECRETARY CALLBREATH: I have a communication which I am sure we will receive gratefully, which I will read:

The White House, Washington, Sept. 13, 1915.

TO THE MEMBERS OF THE AMERICAN MINING CONGRESS:

It is a matter of much regret to me that it is again impossible for me to be with you and to tell you personally of my interest in the efforts you are making toward greater safety and better living conditions for the men who work underground as well as for a higher conservation and a more efficient utilization of our mineral resources.

An organization such as yours, comprising prospector, promoter, owner and miner, should be, as I have no doubt it has been, the means of attaining results beneficial to all connected with the mining industry. Your opportunity is great and I trust it will be your good fortune to embrace it to the fullest extent.

With best wishes for a successful meeting, I am

Cordially yours,

WOODROW WILSON.

SECRETARY CALLBREATH: If I may be pardoned, I would like to make a little reference to what has been said by two gentlemen here—very complimentary to the Mining Congress Journal. As most of you know, for a number of years we published a monthly bulletin carrying

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only the Secretary's talk to the members of the Congress, and such matters as were important; but it was a spasmodic publication. A year ago at the Phoenix meeting, after considerable discussion, the Secretary was instructed to begin the publication of a monthly journal. We realized at the outset that the danger of creating any competition or rivalry with any of the regular mining trade publications must be avoided. The Mining Congress needs the support, and has had the support, of the mining journals of this country to a very great extent, and we feel that we must have that in the future, and therefore the Mining Congress Journal must occupy a different field. You will realize how difficult it has been to keep ourselves entirely out of the already occupied fields—the discussion of scientific subjects and of the practical problems of operative mining. We have tried to keep matters of this kind out of the Journal, and it has been very embarrassing to the Secretary to refuse the publication of three or four articles which have been contributed by some of the best friends of the Mining Congress, who felt that the papers they had prepared would be and have been welcomed in other publications, and that would be a help to the Journal to have those articles. I have been obliged to refuse at least two articles that any trade journal in the United States would pay a handsome price for, simply because we felt that by the publication of such articles we would invade the province of the regular trade journals. We want to give to you all of the news from Washington concerning matters of interest to mining men, hearings before committees on mining subjects, bills introduced which will have a good or bad effect upon your industry, administrative acts which are likely to be of importance to you, matters pending before the departments, the decision of which will affect your interests, and, as far as possible, to give you all the information not given by other journals but which you ought to know as soon as possible in order that you may decide whether you should support or oppose such measures or proposed acts. We hope, through the system we have established, and the close co-operation given us by the Bureaus at Washington which have to do with mining, that we can give you in advance much of information, some of which the departments cannot publish for months or years after the work has been done. We hope to give you a synopsis of work of these governmental bureaus which serve the mining industry at a much earlier time than you would otherwise receive it. I say this so that you will understand the reason why we refrain from publishing scientific discussions and keep ourselves down to the discussion of economic subjects and such news as is not published by other mining journals. We hope that the Journal will be a real advantage to the men who read it, and I am sure, as our organization proceeds, we will be able to give you a much better service than in the past. The Journal, as you know, is sent without extra charge to all our members, and as the basis of associate membership is simply a subscription to the Journal, we hope the time will come when the Journal will not only fill a need for you, but that through it we may carry a discussion of our needs to people who should know about them, in order that we may create that public sentiment which is so necessary to our success.

Tomorrow noon we shall hold a memorial service, as the program shows, and we are anxious that everyone in the City of San Francisco who would like to pay a tribute of respect to the memory of the late Director of the Bureau of Mines will be present at that meeting. We hope to give everyone an opportunity to say a few words, with the understanding that the stenographic report of his remarks can thereafter be corrected and amplified as desired, in order that the memorial volume which we hope to publish, carrying the proceedings of this meeting, will carry to the family of Dr. Holmes a correct tribute of the Mining Congress and its members.

On Wednesday we are to have a banquet in honor of the new Director of the Bureau of Mines, and we hope that will be largely attended, in order that California and the Mining Congress may secure the most

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complete working co-operation with the Bureau of Mines in its future activities. The Bureau of Mines is today, as the Geological Survey has been, and is, a great agency in the development of the mining industry in the West.

Let me ask you now to select your member of the Resolutions Committee. As stated before, the committee is chosen by the members representing the various states who are present. If there are several delegates from one state, those should select from their number one to represent them on this committee. If but one delegate is present from any state he should name the man whom he desires to serve on that committee and who he knows is in the city.

Let me add, that the memorial service will be held in this hall; the banquet will be held at the Palace Hotel.

The roll of the states was called and the following persons named as members of the

Resolutions Committee.

A. L. Carter, Jerome.....Arizona.
William Maloney, Nome.....Alaska.
E. Colcock Jones, Los Angeles.....California.
J. C. Roberts, Denver.....Colorado.
Gardner F. Williams, Washington...District of Columbia.
J. B. Eldridge, Boise.....Idaho.
John P. Reese, Gillespie.....Illinois.
R. C. Allen, Lansing.....Michigan.
Otto Ruhl, Joplin.....Missouri.
F. S. Lusk, Missoula.....Montana.
David B. Rushmore, Schenectady...New York.
Frederick L. Hoffman.....New Jersey.
George H. Utter, Silver City.....New Mexico.
Dudley Baldwin, Cleveland.....Ohio.
George S. Gray, Portland.....Oregon.
H. M. Wilson, Pittsburgh.....Pennsylvania.
Joseph Hyde Pratt, Chapel Hill.....North Carolina.
J. C. Dick, Salt Lake City.....Utah.
W. D. Waltman, Casper.....Wyoming.
Richard Mansfield White, Seattle....Washington.
J. H. Richards.....At Large.

PRESIDENT SCHOLZ: On the front page of the program you will notice the little note regarding the disposition of the program, and I am going to call on the Secretary to tell you just what he had in mind when that clause was inserted.

SECRETARY CALLBREATH: Mr. President, what I had in mind was this: I have attended a number of Conventions in exposition cities, and have found that the exposition was so much of an attraction that our delegates, like delegates to the other Conventions, have been inclined to say: "I can read these addresses and discussions in the printed proceedings of the Convention, and this is my only opportunity to see the Fair. They will not miss me." And when such a feeling as that is universal, it leaves speakers without respectable audiences. I hope this Convention will be different, and that the subjects under discussion will be sufficiently interesting to hold all the delegates in the meeting, but those who feel that you ought to spend a certain amount of your limited time at the Exposition rather than in attendance upon a program such as we have here outlined, we ask to indicate that we should shorten up these meetings, and to decide upon such time as you are willing to be here. We have outlined a form of program which seemed to us the best that was possible. If you want this changed, we will change it to meet your views, but having agreed that this or any other plan is right, we want you to make it your business to see that proper attention is given to the discussions.

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MR. BASSETT: Mr. President, may I make two points, please? You will recall your Secretary shied a brick at me, and because this is a Mining Convention, I take it that it was a gold brick! (Laughter.)

Unfortunately, this building has been named "Exposition Memorial Auditorium," a name which will not continue to obtain, because it will come to be known, as it is now known to most San Franciscans, as the "Municipal Auditorium," or the "Civic Center"; but its official title this year is the "Exposition Memorial Auditorium," because it is under the control of the Exposition, and does belong to the Exposition at the present moment. Out of the money subscribed to this Exposition, a million dollars was taken to erect this Memorial Auditorium at a sufficient distance from the Exposition Grounds so that no Convention delegate could say that we were trying to get his fifty cents admission fee when he attended the sessions of his Convention. (Laughter.) And you who have attended expositions before know that such a practice has been followed in most instances. We wanted to avoid that difficulty, and in the generosity of our hearts, we erected this building more than a mile away from the grounds, so there would be no complaint of that kind. But we regret this confusion of terms more than you do. It is this year called the "Exposition Memorial Auditorium," because it is under the control of the Exposition. The City of San Francisco in its budget provided something more than seven hundred thousand dollars for the purchase of the land upon which the building stands. With the furnishings of the building, the whole investment has been a little over two million dollars. This Auditorium will be handed over to the City of San Francisco at the close of the Exposition as a permanent memorial. Other parts of the Exposition are now under contemplation for preservation as well, but this is the one thing which is already provided: this is the sure memorial of the Exposition.

My other point has reference to the remark which your Secretary has just made; that the program is in your hands. May I suggest that one great part of our Convention preparations has been the grouping of various interests so that related Conventions should meet at approximately the same time. You know that last week the various engineering conventions were in session. This morning, opening on the first floor of this building is the Engineering Congress, in which most of those engineering societies are participating, which means that in the week or two weeks an individual with a special interest along some engineering line can come here to San Francisco and get that major interest satisfied in the Convention dealing with the line for which he cares the most, or with which he is the best acquainted, and during the same week or ten days, Mr. President and Mr. Secretary, he can see something of the Exposition, and, of course, we have had the hearty co-operation of all these Convention bodies in so arranging their programs. It is "mining week" which has brought you here. The subject of mines is the keynote of the whole week. We just closed a wonderfully interesting "dental period" of two weeks; the "medical period" occurred in June, and the "educational period" the first two weeks in August. Our general plan has worked out far beyond our expectations, and as has been indicated, this is simply one of the means we have used for being of service to the people who come to our Exposition City. We have tried to arrange it so that we could bring together in a given period all conferences or Conventions in which certain groups of people or artisans or professional men are interested, and for which they care the most, thus saving the two or three trips that would otherwise be necessary. However, if this is just a suburb of Salt Lake, as was suggested by one of the speakers, it would be very easy to drop over here almost any time! (Laughter.)

PRESIDENT SCHOLZ: We would be glad to hear some expressions from you as to future sessions, whether you desire us to carry out the program as outlined, or whether shorter sessions, and more time thus available for visiting the Fair would be preferable. If there is no one who would suggest any deviation from the program as outlined, we

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accept it for granted that it meets with your approval, and as we have saved fifty cents through not being compelled to go to the Exposition grounds, as suggested by Mr. Bassett, I would suggest that we adjourn now for luncheon and assemble at 2 o'clock to hear the speakers who are going to honor us this afternoon.

One moment, gentlemen; there are two speakers on the program whom I am sure everyone present will want to hear, Mr. Manning and Mr. Smith, and I am going to ask you again to be kind enough to be here promptly at 2 o'clock.

The tickets to the banquet can be had at the Secretary's office at the Palace Hotel.

Whereupon the morning session was adjourned at 11:25 o'clock.

MONDAY, SEPTEMBER 20, 1915.

Afternoon Session.

The afternoon session convened at 2:20 o'clock, with President Scholz in the chair.

PRESIDENT SCHOLZ: Has the Committee on Resolutions any report to offer this afternoon?

JUDGE RICHARDS, Chairman of the Committee: No report. As yet no resolutions have been referred to the committee.

PRESIDENT SCHOLZ: Are there any resolutions to be offered?

SECRETARY CALLBREATH: Mr. Chairman, may I suggest to the gentlemen present that the Mining Congress wants to be serviceable in getting things accomplished for the mining districts? The fact that last year we went on record in favor of a certain proposition does not mean that it is not wise to introduce that same resolution again, because the publicity which will come from the publication of a resolution is of advantage. It is very important that those of you who have matters which still need action, shall have them considered by this Congress through resolutions which may go to the Resolutions Committee for its action.

JUDGE RICHARDS, Chairman of the Committee on Resolutions: The Committee on Resolutions is organized and ready to engage in its work as fast as resolutions are referred to it.

PRESIDENT SCHOLZ: The American Mining Congress was greatly interested in the establishment of a Bureau of Mines, and we are very fortunate to have with us today Mr. Van Manning, the second Director of the Bureau. In speaking of him as the second Director, I think I may say that he has been one of the first Directors, because he was Dr. Holmes' right-hand man; was with him from the very beginning of his work, and knows more about the plans that were laid by Dr. Holmes than anyone else. Mr. Manning has prepared a paper on "What the United States Bureau of Mines Is Doing and Hopes to Do for the Metalliferous Mining Industry," and I am going to call on him to address the meeting now. (Applause.)

Mr. Manning's address will be found at page 103 of this report.

PRESIDENT SCHOLZ: In behalf of our members, I want to thank Mr. Van Manning for the very illuminating address just delivered. As a coal miner, I am somewhat surprised at a great deal of work that the Bureau has been doing for the mining industry, because I felt that we had monopolized all their efforts. Therefore, it is more or less of a surprise to me that so much has been done for the metal industry; but I am sure it will be received with a great deal of gratification by you Western people.

It is scarcely necessary for me to introduce the next speaker, because he is better known to you than any other man in this room, I presume, and I will call on Dr. George Otis Smith, Director of the United States Geological Survey, without any further introduction, to deliver his address. (Applause.)

DR. SMITH: Mr. President, ladies and gentlemen: You may recall, Mr. President, that two years ago I addressed the American Mining

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Congress at their meeting in Philadelphia on the subject, "Plain Talk." At that time I tried to preach the use of direct statements, and also practice what I was preaching.

Of late my thoughts have turned more and more to the need of popular language in stating technical results. Hence this afternoon I venture to discuss "Plain Writing" from the standpoint of a Government scientist.

Dr. Smith's address will be found at page 114 of this report.

PRESIDENT SCHOLZ: I think the Congress is to be congratulated upon having heard two of the men to-day who know more about the plans of the Government toward the mining industry than any other men in the country, and I want to take this occasion to say to both of those gentlemen that the Mining Congress as a whole heartily endorses the work of the Bureau of Mines and the Geological Survey, and stands ready to give them any further assistance that they may need, both in the State Legislatures and in our national legislative halls.

There is one more man in this room who knows a good deal about the relations of the Government towards the mining industry, particularly on account of his long friendship and personal acquaintance with Dr. Holmes. I refer to Dr. W. B. Phillips, the former Director of the Geological Survey of the State of Texas, and now the President of the Colorado School of Mines. If Dr. Phillips will please come forward to the platform, we will be glad to hear from him.

DR. PHILLIPS: Mr. President and Fellow Members: I very much enjoyed the paper of Mr. Manning and that of Dr. Smith, and I can add a little from my own personal experience to what Dr. Smith has said in regard to the use of exact language. The trouble is that in this country we are putting the training of young people in the use of the English language some five or six or ten years after they have left the primary schools. We find in the School of Mines in Colorado, and I suppose it is the same with other mining schools, that our seniors are unable to write the English language! (Laughter.) They are unable to speak it also. The American family has long since been destroyed; there is no such thing nowadays as an American family; there are a lot of parents under instruction by the children, but the family is gone! (Laughter and applause.) To see the old-fashioned family, we have to go among our Jewish brothers. The Americans have long since outgrown that, and when the children go to the high school they do not know how to speak properly, and when they leave the high school they do not know how to speak properly or to write properly, and when they leave the mining schools they do not know anything at all about the use of English! (Laughter.) I am sorry to make this confession here, but I know what I am talking about. And, speaking of technical writing, it is not so much the choice of nomenclature, but whether the English that is used in writing a report shall be understandable by the people at large. We all understand it is necessary to use technical terms. We cannot have a science without them, but they form a very small part of any technical report, perhaps not as much as 5 per cent. It is the choice and arrangement of the English language that constitutes a technical report, whether that be in ten or fifteen pages of manuscript, or a thousand pages of printed stuff. And I wish to make an appeal to you to-day, such of you as represent the long-lost American family, now as scarce as the dodo, to see whether we cannot institute some change in American life to-day by which the children who go to the common schools shall understand and practice ordinary plain English. (Applause.)

We are producing an excellent course of English in the Colorado School of Mines. We had a fight this year to introduce English in the sophomore class, and I had to cut a pretty good hickory stick to convince those people that we might at least require it in the sophomore class. Heretofore we have been having such a course in the freshman class; now we have it in the sophomore class; next year we will introduce it into the junior class, and finally, by perseverance, we will have

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English perused clear through to and including the senior class. We are going to have four years of it. (Laughter and applause.)

I do not think any of us appreciate exactly what the relation of the use of correct English bears to employment. I have had occasion recently to look into that matter, and some of the best engineers in our part of the country have told me that they had received letters from graduates of mining schools—Colorado included—asking for employment, and the letters were couched in such awful English that he threw them into the waste-basket and never has answered them. Now, that's a fact, and I can give names and dates if necessary. It transpired in the city of Denver not more than three months ago, and these letters were from graduates of technical schools, and they did not come from the western schools, all of them; some were from Yale, and some from Harvard. That new consolidation of Boston Tech with Harvard has not improved the use of English in Massachusetts. (Laughter.) I say that's a burning shame, that the young men we are sending out from the technical schools cannot even use their own mother tongue intelligently, when it comes to writing it down and submitting a page of decent English.

And the same is true of mathematics. I have seen some technical graduates within the last six months. They had the degree of Engineer of Mines, and I hope that the Almighty will pardon the school that confers a degree of Engineer of Mines in four years on those who could not understand the rule of three and could not figure out the simplest little metrical relations in ordinary general chemistry. And yet those fellows had the degree of Engineer of Mines!

I think we are coming to the time when this whole business of technical education will have to be turned upside down, and the most of it spanked! (Laughter.) We are trying to teach too much in four years. I think that one of the greatest things that the American Mining Congress could do today would be to insist upon a standardization of technical education in mining schools. It's a thing that we have neglected too long. We speak of the conservation of our natural resources —including natural gas! I hope that will be a long time in coming, because it will deprive me of a living! (Laughter.) But we do not hear anything about the conservation of brains and efforts, and it is along those lines that we are all, I think, the greatest sinners.

We have a half-dozen or more mining schools over in the western part of the United States. There is room for about one, but we have six of them, and it will be a long time before we can abolish the other five! (Laughter and applause.)

I would like very much to see a set of resolutions presented to this Congress calling upon the officials of these schools of mines in the western part of the United States to get together in the standardization of mining and metallurgical courses. We are duplicating each other's work and infringing upon each other's preserves, until the outrage cries to high heaven, and I hope that some of our good friends will submit to the Committee on Resolutions something to this effect, so that the stigma placed upon technical writing may forever be removed. We may continue to profit each year as we go along by the wisdom embodied in Dr. Smith's paper.

There is another matter, if you will excuse me, concerning which I will ask you to hear me. Dr. Holmes' great work in this world was for humanity. I suppose I am his oldest friend here. I have known him well for nearly thirty-five years. He came first as a graduate of Cornell University to the University of North Carolina, as professor of geology and mineralogy. During all these years our association has been particularly close and intimate. I have followed his career with increasing admiration and affection, and each year he grew into the final flower of his achievements. The thing that lay always nearest his heart was the betterment of conditions under which mining and metallurgical affairs are administered in this country. I do not think that

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he neglected at any time, day or night, the consideration of this matter, because it lay upon his heart, and his heart was as great as all outdoors. There was no boundary to be set upon the heart of Dr. Holmes; it was as big as all outdoors. In Colorado we have been attempting to set in motion a great memorial to the memory of Dr. Holmes, one that shall not be of stone, or brass, or polished marble, but we have erected there, in connection with the Colorado State School of Mines, a Joseph Austin Holmes professorship of safety and efficiency engineering. That action was taken by the board of trustees on the twelfth day of August, and in October we are ready to elect this professor. Unfortunately, I did not speak with Dr. Holmes before his death about this matter, as I considered it one of some delicacy, but immediately upon his death that chair was established, and we propose to see that it is equipped, furnished and operated in accordance with the plans which lay nearest his heart. Bear with me if I seem to speak somewhat personally. I think no such chair as that exists in connection with any technical mining school in the United States. We, therefore—and we say it with some pardonable pride—we are the first to enter the field, and I do not think if we had considered this matter for years that we could have hit upon a happier solution of the matter of a memorial to this great and good man than a professorship which shall devote itself to the training of men in safety and efficiency engineering. (Applause.) It lies therefore upon our hearts, and I commend it to your kind consideration. We have sufficient means to carry that chair along, and to equip it, but we shall need additional endowment, and I am going to call upon every personal friend of Dr. Holmes within the hearing of my voice, and also through the press and through circulars, to aid us in carrying this great work forward in plans that would have met with his own approval.

My friends, in referring back to Dr. Holmes, I do not think I could conclude these few desultory remarks better than by referring to the words used by old King David, when the death of Jonathan was reported to him—his lifelong friend, his companion in arms, his steadfast supporter, his wise counselor. "My friends," he said, "know ye not that this day a prince hath fallen in Israel?" I thank you. (Applause.)

PRESIDENT SCHOLZ: I am sure we have enjoyed the very beautiful address delivered by Dr. Phillips, but I want to call your special attention to the close adherence to the subject of his address, which is "The Federal Government and the Metalliferous Mining Industry." Dr. Phillips has not mentioned one word about it in all his half-hour's talk! Therefore, I'm going to call on the meeting at large to talk on the subject so that we may know what we have come here for. The meeting—

DR. PHILLIPS (interrupting): Mr. President, if you call upon me to give an excuse, I might say that I don't know a single thing about that subject! (Laughter.)

SECRETARY CALLBREATH: Mr. President, you gentlemen represent the mining industry. You know what you want these officers at Washington to do for you. Dr. Smith has told you what he is doing; Mr. Manning has explained what he is undertaking and proposes to do. Now, those gentlemen want to know what you want them to do. This is the proper place to discuss it. Having decided what you want them to do, the next thing is to devise the means by which they shall be able to accomplish the things you want them to do. This is a very practical question, and I hope the gentlemen present may take it up and discuss it, and that we may arrive at conclusions as to what may be done. You know the Bureau of Mines and the Geological Survey cannot print documents nor send out a single bulletin or card unless there is an appropriation made by Congress to pay the expense. We are the organization through which that propaganda must be carried out. Unless we take the initiative, many things will be left undone that should be undertaken at once. For instance, let me point out that the Department of Agriculture prints an annual year book. It is of great value to

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the farmers of this country. The department prints, as we understand, four hundred thousand copies each year, which it distributes free, to the farmers of the United States. The farming industry of this country is so organized, and Congress so recognizes it, that there is no trouble to get the appropriation by which that printing shall be done, and the books sent to the farmer. A great publication recently issued in the interests of the mining industry is a book just completed by the Bureau of Mines—a Codification of the Mining Laws of the United States. It is a very valuable publication of two volumes, and is the most complete of its kind along any line that has ever been compiled. We asked the Department of the Interior to provide an appropriation by which that might in a limited way be distributed free to the miners of the United States. It cost thirty-five hundred dollars to get the first few volumes. We asked fifteen hundred dollars additional to publish a sufficient number for reasonable distribution. If the Government is going to distribute year books to the farmers for the Department of Agriculture, why should not the mining industry also have similar recognition? (Applause.) We plotted and we schemed and begged for that extra fifteen hundred dollars by which these copies might be distributed, and we failed to get it. There was no appropriation available through which our request could be met. Is it not time we created the means by which we may demand of Congress that in a matter of such importance there shall be an ample distribution of so valuable a work to the mining men of this country? It is of great advantage to us that we shall be able to buy that book at a nominal cost, a book which would cost from fifteen to twenty-five dollars if published by the leading law publishing firms of this country. It is of great advantage that we shall be able to purchase such a book for two dollars and fifty cents, and it is likewise a great advantage to us to have it available in any way. But when the agricultural industry may have four hundred thousand copies of its book published each year, it does seem that we might have thirty-five hundred copies of our book published and available for distribution. It is up to you gentlemen to organize and devise the plans by which we may have better representation in Washington, and be better able to demand of Congress that the needs of the mining industry shall be recognized. I hope you will take part in this discussion and tell us how it ought to be done.

STEPHEN M. SMITH, Boise, Idaho: Mr. Chairman, Ladies and Gentlemen: There has not been anything said in regard to monazite and zircon, two of our very important metals in the uses of gas and electricity. I wish to say that we have, in the United States, an abundance of these metals in one particular location that I know of, and that is the channel of Moore's Creek, Boise County, Idaho, of which demonstrations and tests have been made.

It appears to me that our Government should assist in the manufacture of these products and protect the parties who might embark in the manufacture of the same, for after the war, no doubt, Germany will proceed to control the market of the gas mantles and all other lines of industries from these metals, and I would like to see the Government take the matter up. As I understand it, Germany has been producing 85 per cent of the monazite of the world and Brazil about 15 per cent, and as you all know, the mantles for your gas lamps come from the result of Germany's production, and having these minerals here, it would seem that our Government ought to take the matter up.

I have just been reliably informed that they have discovered a process of putting zircon together to make brick for furnace lining purposes that has been tested up to 6,000 degrees of temperature, without being impaired by the heat, which is a very important point in the electrical furnace work. And, gentlemen, we have this monazite and zircon in great quantities in Idaho. There is no direct market for it in the United States, and I would like to see the matter taken up so as to give us an opportunity to market the same. Thanking you, gentle-

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men, for listening to me on this, I would ask your indulgence to listen to a few more words on another matter.

I have just been recently granted a patent upon a grapple that is a grapple, which is particularly adapted for handling boulders. It will handle and catch all sizes of boulders, kind and character; that is, long, round, smooth or whatever that may be, so that the man at the levers can, from the end of his boom or his derrick or cable, drop over boulders of any shape, size or nature, pick them up, run them back and drop them wherever he pleases, without any chain or sling heretofore used. I am now manufacturing the same and have demonstration models to be seen, and if anybody wishes to see same, I will be glad to show them that this problem of boulders which has so long been bucked up against is now easy and the man at the lever can easily get them out of the way.

PRESIDENT SCHOLZ: This discussion, gentlemen, is of so much importance that I am quite sure we will have at least half a dozen speeches before we adjourn, and I do not want you to be backward; come right out and tell us what you want. Your officers try to do their duty, but they are not mind readers; they have not reached that stage; and unless you tell us how to help you, and what you want the Government to do, we cannot help you. So get up, and discuss anything of importance to you, as suggested by Dr. Smith, and tell us the whole story.

MR. HERBERT M. WILSON: Mr. President, we all hope that the Bureau of Mines may ere long be in a position to add materially to the very splendid work it has already done along one line of endeavor—that of statistics regarding the causes of accidents in mines. I speak with much feeling on this matter, because it has been my duty in the last few months to try and determine a basis for appraising the relative value and importance of the causes of accidents in mines. A condition has recently been brought about by workman's compensation legislation which causes the mine owner to pay good money for every accident which may occur in his mine, and makes him want to know something about how he can prevent accidents. And valuable as is the statistical work already done, being the only source of information on such subjects, yet there is so much more to be done to make it of real, immediate and intrinsic value to those who have the subject of the settlements under workman's compensation to consider. I do hope this Congress may find it possible to express in formal resolution to the Government a desire that even more intensive work may be done towards determining not only the means of prevention of accidents, concerning which the Bureau has done so much, but concerning their causes. I thank you. (Applause.)

MR. E. L. BARTHOLOMEW: Mr. President and members of this Mining Congress. I would just like to bring out a thought here from a practical miner. It has come to me since visiting this Exposition through the wonderful exhibits that have been given to the people by the different States. The United States Government has a wonderful exhibit along mining lines, the finest I have ever seen in all my experience, and I would like to see some of it kept up, and my thought is, along these lines, they have there a demonstration of assaying, and the working of different ores. Now, in our universities they give—the University of California gives four years of technical training to a technical student, and I have in mind for them to give something to the practical miner, not a four years' course, but something of maybe two months, or three months of practical assaying, fitting the practical man, when he goes out in the field, to determine the values of the different minerals he would come in contact with. Now, in the University of Nevada they give a summer course there to the prospector, and I think that the Government ought to take in hand to educate the practical man so as to fit him to determine the value of what he finds. It has been my experience—I have prospected more or less in this western country—that you often come

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in contact with some mineral or some rock, and you are puzzled as to what it is, or what it contains; and the view that I had was to have a permanent course for the practical man, where he could get some of the benefits that are given the students in our mining colleges, so that he wouldn't have to go through an examination to take a course, or anything like that; but my idea is to try and reach him through a short course of some practical teaching, such as they are demonstrating out on the Fair grounds. (Applause.)

PROF. F. W. SPERR, Houghton, Michigan: Mr. Chairman, in reply to Mr. Bartholomew's suggestion, I would say that I am in hearty sympathy and accord with every effort to help the practical miner to the best possible understanding of the materials and operations with which he is in daily contact. I wish I could tell you in a few words what I know the practical miner can accomplish with a little educational advantage—the miner who may have gone to work as a trapper boy in the mines of the old country when he was seven years old, or as a powder boy in the mines of our own country when he was ten or twelve. He is the man upon whom have devolved the responsibilities of our underground operations, both engineering and managerial; but he is rapidly giving way before the modern demands for calculations for which he is not prepared. But with the educational training that should be given him, and that he is capable of taking on, he will continue to make the best possible underground superintendent for the future as he has done in the past. My own experience with the education of such men began twenty-seven years ago, when I was called from the field of practical mining in the West to take charge of the mining end of a two years' course that had just been inaugurated at the Ohio State University. I would only weary you by telling the trials and troubles and misgivings of those first brave fellows who came in to try the experiment, and to rehearse to you their later successes; but they came as pit bosses, coal diggers and mule drivers, and they went back as mine surveyors and mine superintendents; and I am told they are doing it yet. They made better citizens, better men for their companies; and, above all, better men for themselves. Since that time "short courses" for practical men—farmers, miners and mechanics—have been inaugurated not only in many educational institutions, but also in various industrial establishments. The Cleveland-Cliffs Iron Company of the Lake Superior district has for a number of years conducted a school for its employees in all operating departments. Only this last year the Michigan College of Mines inaugurated special short courses for practical mining men; and we read from a circular recently issued by the college what is proposed to be done and what has already been accomplished. The results are encouraging; and I would suggest that a Committee on Mining Education, with special reference to the men who have been deprived of the privileges of early education, be appointed by this Congress.

MR. GEORGE H. UTTER: Mr. President, I would simply suggest that the President appoint a committee including the two gentlemen who have last spoken, to prepare a resolution in proper form to go before the Committee on Resolutions covering that subject. Then we will get the subject in practical form, which may result in its being taken up by our mining schools in the several States and colleges through the East and result in general practical work for the man who needs it most, and where it would benefit the several communities most.

MR. BARTHOLOMEW: I wanted to bring out why I had this thought. I had occasion to want some practical training along a certain line, and I went out to the University of California to get it. Now, they have there an institution donated by Mr. Hearst, that covers an appropriation of over five hundred thousand dollars, and I went to one of the professors out there and I wanted to do some certain work. "Now," he says, "the only way you could get that is to come in and take a course with the students." Now, they have got a wonderful insti-

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tution out there for the benefit of mining. They have got, I presume, one of the finest laboratories for practical work that there is in the United States, and it's lying idle, and the enrollment this year has fallen off to almost nothing, as far as the mining end of it is concerned. The reason I bring this out is this: Why should these facilities lie idle, when so many practical men, so many prospectors, are eager to take advantage of such a school? That's why I am bringing it out, and I think something should be done.

Now, I brought out that the Michigan School of Mines last year had a summer course for the prospector, which has done a world of good to the practical miner. Now, out at the fair here, I had to go there to get what I could not get at the university, because there the Government, through its generosity, is educating the people up to what we are doing along mining lines. That put the thought in my mind that something permanent should be done. Now you take it on the fair grounds —a practical miner can go there, and he can get more in five or six days than he can get out of all the books that are printed in the United States on those subjects, because you get it in action. You can go and speak with intelligent technical men and ask why is this or that so, and I should think that something like that could be done for the prospector and for the practical man, so that he would be able to cope with these things. It has been my privilege as a practical miner to co-operate with the technical men. In my experience I have met many graduates from the different mining colleges of the United States, and it has been a pleasure for me to get technical training from them. The two must go together, but the poor prospector or the practical man does want so much to get things that he cannot get otherwise. You can read a book, and read, and read, and read, and still it does not suffice. You must see this in action. That's why I am drilling this out so forcibly.

DR. DAVID T. DAY, Washington, D. C.: Mr. President, it is a very gratifying thing to see how the exhibit that Dr. Holmes has put together out at the Exposition is appealing to the practical miners, and I wish he were present to hear how that is really taking hold; and it's a gratifying thing to all those who have had to do with getting that exhibit together to learn how it has really helped.

But, Mr. President, I find on the program here that the Congress has been kind enough to set apart for the present hour a very definite topic, and there are so many other topics which are evidently of live interest here, and call for discussion, that it seems to me the quicker we can get action on this particular topic, and as far as it is interesting to discuss it and get it out of the way, the better, and I am just going to make a plea of about two minutes, by way of really introducing this subject of the relations of the Federal Government to the metalliferous mining industry.

I would call your attention to the fact that there are three ways to consider it, which, if we can get them sharply in mind, are going to be of a great deal of help in effecting co-operation between the metalliferous miners and the Federal Government. There are, in the first place, two points of view that I have in mind. One of them I am not going to discuss, because I would throw a firebrand in the place, and what I had to say would be absolutely atheistic to every mining man in the crowd. You would not bear with me for a minute. The other, I am going to talk about. The first is the attitude of the Government towards public lands, which contain metalliferous deposits. What the Federal Government can do towards metalliferous mining on public lands is one thing. It's something on which we want gradually to build up a policy. But I had rather that some man less radical than myself would have something to say about it. The other is the relation of the Federal Government to the metalliferous mining on privately owned land, what the Government can do, and what not. It is well to remember that the Federal Government should be called on to carry out such investigations as are obviously impossible for the individual or for one mining engineer

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to carry out, or for the officials of a particular State—problems that are absolutely national in their character, and therefore must be carried out by the National Government. Now, Mr. Wilson gave you a particularly good instance of what could be done in that respect. Am I exceeding my time?

PRESIDENT SCHOLZ: You have all the time you want, Dr. Day.

DR. DAY (continuing): I will only talk a couple of minutes. The gathering of statistics of a particular group of mines amounts to almost nothing of educational value. The statistics of one State are imperfect for the best purpose. Another thing, it requires a National Government to do statistical work with success, principally because of the impartiality of the view of the National Government, and the broad ability that comes to the national investigator by studying varying conditions in different parts of the country. Just as we count money in a mint and nowhere else, so we should count our statistics in the national mint of statistics—in the United States Geological Survey. It has been the Division of Mineral Resources that has given the great foundation of stability to that wonderful organization. There was a time when they did not think very much of that line of work, but a man who begins an article in the Geological Survey now and does not refer to the mineral resources of the United States is not in it at all. The editor would call him down in a moment. The same thing is going to be true, I hope, in the Bureau of Mines, that the specialists will have for their basis some comprehensive idea obtained by thoroughgoing statistical work, showing in its character what actually is going on in the different mining industries, not only as concerns accidents, but taking up the work fundamentally to determine the actual figures in regard to the metalliferous industry. That's one thing they can do.

Now, if in addition to that, we can study here this afternoon what other general problems are vitally desired by you people, which can only be done by the Bureau of Mines, and if those can be pointed out, I think we will have spent a very profitable half-hour or hour; and I should appeal to you to "talk out" those problems which are general in their character; first, what you want done. Now, for instance, in the Bureau of Mines and in the Geological Survey there is one very useful purpose performed. You send in to the Government a sample; there was a time years ago when that sample was received with a moderate amount of scorn; it was brought in and kicked aside and some kind of an evasive answer was sent to the man to get rid of him. Now the National Government wants every sample of that kind that they can get; they want every prospector to send in everything of that sort that he can; and one of the most vital sources of new information is for the prospector to send in that little bit of a crumb of something or other that he does not understand—in the first place, when he does not know what it is, and in the second place, when he does know what it is, but does not understand why it is where it is. Now, that's a vital thing to some of the best results the Geological Survey has obtained in metalliferous mining lately. The best results, I repeat, have come from the presentation by mining engineers of problems or conditions of two or three different things which were not intelligible to him. Now, if you will bring those things to the Bureau of Mines or Geological Survey, whichever is appropriate, it will be of great assistance to our industry. And we want you to understand what the duties of these bureaus are, and if you send to the wrong one, we will send your communication to the proper place. We want you to send those things in, and thus make a beginning. It seems you do not need the National Government on anything that anyone can attend to by himself, but as a matter of fact it works well for you to send in those specimens and let us have your inquiries. That's going to help this broad statistical investigation. Now let's hear from you what you want, along some line that the Government can attend to better than anybody else can. A man who examines a thousand variations of a similar problem can handle it better and cheaper

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than anybody else. We do not propose to make analyses; that's going too far; but we will tell you how and where to get them. We will not interfere with the professional analyst or professional mining engineer. But where it takes ten engineers working in co-operation to do a piece of work, that's where the Bureau of Mines comes in and does the work which one man or State cannot do.

Now, let's get at these things through you. That's what we are here for, to attack those problems which are to be taken up by the National Government which the private individual cannot do. I thank you very much. (Applause.)

PRESIDENT SCHOLZ: If you will pardon me, I will make one suggestion which occurs to me as being very vital, and that is the question of cost accounting in the coal mining industry. A fraction of a cent frequently determines between profit and loss, and having operated a number of mines in various districts, it has been very forcibly called to my attention that certain items of cost in one district were lower than in another, and it took some little time to analyze and find the reasons why such was the case. On my last visit to Washington, when Mr. Parker was the statistician in the Geological Survey, I suggested to him that it might be proper for the Government to collect such figures and disseminate the information disguised, so to speak, in a manner so no one would take offense if his figures should be higher than those of his neighbor's. But it certainly would be beneficial to know whether my figures are higher than those of my neighbor, and why. This is something no individual can accomplish, and no State can accomplish, and which will only be of benefit if we get information embracing the entire industry. I realize it is a very delicate subject and one which must be treated very carefully, and perhaps on that account has been neglected, but I am sure, in this age of economy and efficiency, it is one of the things that we cannot afford longer to neglect. It is one of the many things that can be done, and perhaps one of the more important things. I am sure there are many more ideas on that subject which can be brought out, and I will call on you now to give them to us. (Applause.)

MR. GEORGE S. RICE, Pittsburgh, Pa.: Mr. Chairman and Gentlemen: I reply on the one point spoken about, that of cost keeping. The Bureau of Mines engineers are given certain data sheets for collecting confidential information regarding various features of mining operations; among others there are sheets relating to costs of mining. While the bureau has met with response on the part of mine operators very generally, and I think has established itself as a bureau to be trusted, so that operators feel they are safe in giving the bureau confidential information, the greatest difficulty is to make use of that information.

Very few of the mines have any system of account keeping, and they often do not know what their mine construction costs, or what are the items that make up the cost of mining. I can mention one very extreme case where a mining concern for years made no distribution of cost items; the only accounts that had been kept were the totals of the amounts paid out and the moneys received. It had no knowledge whatever of what its product was costing, no separation between equipment and running cost.

That is the most extreme case I ever ran across, but there are all kinds of intermediate conditions found in mine cost keeping. It should be of great value to the operators and to the outside public to formulate some common system of cost keeping; it would then become comparatively easy for the Bureau of Mines or other agency to get accurate, understandable mining costs, which could be used in averages for districts without giving the names of mines, but until that is done, from what data has come in, I really do not see how any compilation of value can be made.

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It may be asked, what would be the advantage to the public or to private interests to have the average costs of certain districts. In my opinion, the value would be very great. First, it would be educational to those operators who do not know what proper accounting systems are; second, it would enable the producers of certain mineral products which are in strong competition to show from such district figures that they could not stand increases in railroad or steamship freight rates or to the labor leaders that the mine operators might not be able to stand any increase in the labor costs under the market conditions.

Finally, in this day co-operation must be obtained for business success, and in view of the growing partnership between the industries of the country and the Government, with the control of freight rates by the Interstate Commerce Commission, uniform, accurate figures are of the utmost importance to an intelligent sympathetic co-operation between the industries and the National Government.

PRESIDENT SCHOLZ: For your information I might add that in one of my recent discussions with the Federal Trade Commission I was told that they would very gladly lend their aid in that direction and endeavor to draw off special forms suitable to the various industries, which would be submitted to the various industries for their use, with the view of bringing about that very result, and Mr. Hurley, who has made a study of that subject, expressed himself as very heartily in sympathy with an undertaking of that character, and felt that much good could be accomplished. As a manufacturer, he found that the severest competition came from those who kept the least records. The larger companies, who know what their products cost them, were usually better competition than those who did not, and as Mr. Rice states, unfortunately there are many companies whose accounts consist of a resume of the amounts checked out, and the balance at the end of the year is supposed to represent profit. No account is taken of other things which must necessarily enter into all expense and operating accounts.

PRESIDENT SCHOLZ (after a pause): "Tempus fugits!"

MR. JOHN P. REESE: Mr. President, we have had a very interesting session today for the opening day of the Congress, and it has been intimated that they have out here in Frisco a great Exposition. I live at least thirty miles from here—started last Monday. We have two more days of business, and I suggest, inasmuch as no one wants very much from Uncle Sam nor Congress, that we adjourn and go and see the fair, and I make that motion.

PRESIDENT SCHOLZ: Before this will be considered, the Secretary will have some announcements to make, which I will ask him to do now.

SECRETARY CALLBREATH: We have an invitation from the Convention of Mining Stock Brokers which will be held in this building tomorrow, to attend its sessions.

I would like to ask those who have not registered to do so and make themselves an official part of this convention. The Mining Congress is the most democratic congress in the mining world. We not only invite those who are not members of the Congress to be an official part of the convention, but we also ask them to become members, either active members, life members, or if they do not feel they can afford that, associate members. The associate membership costs but three dollars the first year and two dollars each year thereafter, and carries with it a subscription to the Mining Congress Journal, copies of which are ready for distribution in the rear of the hall. We are anxious to use the Mining Congress Journal as a medium through which we may carry the inside information concerning the mining industry to those whose influence is necessary to create that public sentiment which we must use in order to accomplish, in legislative circles, what we want. The Journals are free for distribution and examination. We will be glad to have your support of the organization in any way in which you feel you are justified in giving it.

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I want to again call your attention to the memorial exercises tomorrow.

The banquet in honor of the new Director of the Bureau of Mines will be given Wednesday evening, and those who have not made arrangements to attend will kindly do so, if they desire, either with Mr. Wolcott or with the Secretary's office.

PRESIDENT SCHOLZ: Was there a second to Mr. Reese's motion, if it was a motion?

MR. REESE: It was just a suggestion. I now make it as a motion, that we adjourn until 10 a. m. tomorrow.

DR. DAY: Just a moment, before we put that motion, I would say with regard to the matter of cost accounting, that the Palace Hotel is run by a mining engineer on mining engineering principles, and they do their mining in some of our pockets very thoroughly and well. (Laughter.) Now, they have there the most wonderful system of account keeping I have ever seen. I feel sure if any mining engineer is interested in accounts that he will be glad to study their system of accounting, which is on this curve system. It is one of the most wonderfully interesting things I have ever seen in my life, and it is a strictly mining proposition.

SECRETARY CALLBREATH: Each guest is considered a lode of ore to be carefully mined and properly treated. (Laughter.)

PRESIDENT SCHOLZ: Is it a gold extracting proposition? I fear some of us might be considered as dry ore! (Laughter.)

The motion to adjourn was put and carried.

SECRETARY CALLBREATH: A meeting of the Board of Directors will be held at the Palace Hotel at 5:30.

Whereupon at 4:05 o'clock the Monday afternoon session of the Convention was adjourned.

TUESDAY MORNING SESSION.

September 21, 1915, 10 A. M.

The American Mining Congress was reconvened in the Civic Auditorium at 10 o'clock a. m. with President Scholz presiding.

PRESIDENT SCHOLZ: Gentlemen, please come to order. We will first hear from the Resolutions Committee this morning.

JUDGE J. H. RICHARDS, Chairman of the Resolutions Committee: Mr. President, there has been no resolution referred to the committee as yet, so we have no report to make.

Secretary Callbreath presented

Resolution No. 1, Introduced by the Idaho Delegation.

Whereas, More than half the area of the United States west of the Mississippi River is held by the United States not as a sovereign, but as a proprietor in trust for the people, and

Whereas, The right of eminent domain, through which large public utilities are enabled to secure rights-of-way for the construction and development of such utilities as are of public benefit, was early recognized by the Government of the United States as being necessary to western development, and rights-of-way over the public domain were granted subject to such supervisory control by the Department of the Interior as would protect the interests of the public and the rights of other easements, and

Whereas, During recent years the approval of such rights-of-way by the Department of the Interior has been frequently questioned, and many large enterprises, of immense importance in the development of western enterprises, have been prosecuted by the Federal Government with a view to the cancellation of rights-of-way upon which such developments have been predicated, and

Whereas, There would seem to be no reason why proprietary title of the Federal Government should be held more sacred than the rights of private individuals; therefore, be it

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Resolved, By the American Mining Congress, in Eighteenth Annual Convention assembled, that this Congress hereby make protest against the restrictions which have harassed enterprises already undertaken and have prevented the undertaking of many other enterprises looking to a higher development of other western resources. Be it further

Resolved, That we protest against the enactment into law of the principles embodied in the so-called leasing and power bills considered by the last session of Congress of the United States, and again urge that the policy of Lincoln, that the "public lands are a national public possession, held in trust for the maturing States," under which the magnificent progress of the West has been made, shall not be radically changed in opposition to the wishes of the western pioneers, who have made this development possible.

PRESIDENT SCHOLZ: Under the rule, this will be referred to the Committee on Resolutions.

SECRETARY CALLBREATH presented

Resolution No. 2, Introduced by J. E. Kennedy, of Arizona.

Resolved, That the Mining Congress appoint a Committee for the investigation of housing conditions, with the object of bringing about better conditions in the housing of mine employes.

SECRETARY CALLBREATH presented

Resolution No. 3, Introduced by C. F. Willis, Tucson, Arizona.

Whereas, The Arizona Chapter of the American Mining Congress has been in operation but nine months, and has increased its membership from 15 to 500 members, and has caused a fraternal feeling heretofore not existing between the mining fraternity and the State and the business men of the state; and

Whereas, The Arizona Chapter has been largely instrumental in preventing legislation which was seemingly detrimental to the industry; and

Whereas, The Arizona Chapter assisted greatly for the increased appropriation for the Arizona School of Mines, and was very influential in the establishment of the Arizona State Bureau of Mines; therefore, be it

Resolved, That the American Mining Congress urge upon its members the advantages of State chapters and assist in the organization of such chapters.

PRESIDENT SCHOLZ: These are referred to the Committee on Resolutions for further action.

SECRETARY CALLBREATH: In view of the fact that the Chairman of your Resolutions Committee is familiar with the work, perhaps what I have to say is unnecessary, but let me ask that the resolutions as offered to the Committee be returned in original form and without change. If there are amendments to be made, let them be made on a separate sheet and noted as amendments, and referred to in the report. In no other way may our records be kept complete than by having the original on the original sheet, and the amendments, if any, written on a separate sheet. If this suggestion will be kindly adhered to by the Committee, in returning the original, just as presented, it will be of great help in making up the record.

I would like again to make announcement concerning the memorial service at noon today. We are hoping to have all who feel disposed to pay tribute to the memory and work of Dr. Holmes say a few words—perhaps only enough to introduce your name to the record, and you will be given opportunity hereafter to amplify your remarks. We make this suggestion to allow more to speak than could express themselves in the hour that has been given to this service. Therefore, it has been thought wise to let the subject be introduced by the speaker and give him the opportunity to amend or amplify the stenographic report of

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his address for use in a memorial volume, which is to be printed by the Congress as a tribute to Dr. Holmes.

I want again also to call attention to the banquet on Wednesday evening. Thus far there has been but a very small number, perhaps fifty tickets, sold. It will be necessary for us to have in the neighborhood of one hundred and fifty tickets sold to pay the bills. If we have less than that, the Mining Congress out of a not over abundant treasury will be compelled to make up the deficit. That's one point.

Another more important point is, friends, if we in the West, having worked for years to establish a Bureau of Mines, and the Bureau, after getting the appropriations, is working out our western problems, if the new Director as now appointed is brought to observe that we fail to pay a tribute to the memory of one who has done so much looking toward the splendid achievement of the Bureau of Mines, it will be, to my mind, a misfortune. I would like to constitute every one of you a Committee of One to see that tickets are sold in sufficient number to insure the success of this banquet by tomorrow morning, inasmuch as arrangements must be completed tomorrow at the hotel for the banquet, and it will be necessary to make assignments of seats to those gentlemen who participate. I wish you would consider yourselves—all of you—a Committee to take up this matter and see to it that we have three or four hundred people at this banquet, in order that we may show the real thought of the West with reference to the Bureau of Mines.

PRESIDENT SCHOLZ: The next item on the program is the final report of the Committee on Prevention of Mine Accidents, by Dr. Ingalls.

The Committee's report was read to the Convention by Secretary Callbreath, in the absence of the Chairman, Dr. W. R. Ingalls, of New York City.

Final Report of Committee on Prevention of Mine Accidents.

New York, August 17, 1915.

J. F. Callbreath, Esq.,
Secretary, American Mining Congress,
Washington, D. C.

My Dear Mr. Callbreath:

Replying to your letter of August 13, I do not see what there is to be said in the way of a final report by our Committee to the American Mining Congress, except something like this:

The Committee on the Prevention of Mine Accidents that was originally appointed by the American Mining Congress, but later became a Committee of Consulting Engineers in the U. S. Bureau of Mines, to carry on the same work, completed its investigations and studies in the early part of 1915, and delivered its report to the Director of the Bureau of Mines about the end of May. This report, which will be a volume of nearly 300 pages, is now in the Government Printing Office, and will soon be published. Yours very truly,

W. R. INGALLS, Chairman.

SECRETARY CALLBREATH: I want to say that this work is one which is of special credit to the Mining Congress, this Committee having worked for many years to carry out this idea. When the expense of the Committee got so burdensome that we were unable to carry it, we asked the Bureau of Mines if they would take over this Committee, so the expense could be paid by the Government, and this was done. This report is a very comprehensive report—five hundred pages—and represents the work of five of the more prominent engineers of the United States, and is one of very great value. You can receive copies of this report by addressing the Superintendent of Public Documents, in Washington, and you will find it to be a very valuable report.

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Report of Committee on Standardization of Electrical Equipment in Metal Mines.

Gas & Electric Building, Denver, Colo., September 16, 1915.

Mr. James F. Callbreath,
Secretary, American Mining Congress,
Palace Hotel, San Francisco, Cal.

Dear Sir: Your Committee on the use of electrical apparatus in metal mines would respectfully report as follows: that during the year the most obvious work was having the rules adopted by the Congress brought to the attention of the various State Legislatures wherein mining takes place. An analysis of this situation has made your Committee fully convinced that the proper method of approach is to first have these rules endorsed by the American Association of Mining Engineers and the American Institute of Electrical Engineers. We would, therefore, recommend that the President of the Congress invite these two national organizations to assist in this work, appointing a Committee to confer with the Committee of the Congress. Yours very truly,

H. S. SANDS, Chairman.

PRESIDENT SCHOLZ: The next item on our program is a report of the Committee on Uniform Mine Reports, by Mr. Samuel A. Taylor, of Pittsburgh, Pennsylvania, Chairman.

Report of Committee on Uniform Mine Reports.

Your Committee can only report progress. We have in mind a considerable amount of work to be done. We have not had a meeting of our Committee as a whole, but considerable correspondence has passed between the members. Mr. McKinley and the undersigned have been working with the coal operators of the State of West Virginia relative to a uniform system of cost keeping, with, what seems now to be, some success.

We have also thought it worth the effort to have the new "Trade Commission" of the National Government formulate a uniform system of accounting, on somewhat similar lines as to that which the Interstate Commerce Commission established for the railroads of the country. We believe that this would be a good move toward the establishment of a uniform cost keeping method, which, if carried out, we think, would be of great good to the mining industry, and would be the entering wedge for other uniform reports. Your Committee would be very glad to know the opinion of the Congress on this matter, and will await your action with interest. Respectfully submitted,

S. A. TAYLOR, Chairman.

SECRETARY CALLBREATH: May I say in connection with this report that it does not really show what the purpose of it is. As time goes on, the mining companies are required to make an increasing number of reports, giving an increased amount of information concerning various phases of their operations. We have in Washington six or seven bureaus all calling at different times of the year for reports from mining companies, asking various kinds of information. Each State has its own authorities, its labor commission, its bureau of mines, its geological survey and industrial commission, and other commissions, and they are all seeking for reports. In some of the big companies it practically requires two or three bookkeepers all the year round in order to compile and furnish the mass of information and data required by these various State and Governmental offices and bureaus. The purpose of this Committee is to work out a uniform system of reports so that the same report which you make to the Federal Government will carry the information which all of the departments at Washington desire from you, and that the same information contained in that report may also go to all of the State departments; in other words, to embody in one big report the entire matter, so that one report per year will be all that

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is required of you as manager of the mine. This will save a great many thousand dollars to the larger companies, and as time goes on, the smaller companies will find it of advantage as well, because the demand for these records will continue and with the increased cost of control of mines, the furnishing of such information will prove increasingly expensive and burdensome. If this works out, as the Committee hopes, it will be of great and lasting benefit to this industry. Mr. Chairman, may I suggest that the Ingalls report on the Prevention of Mine Accidents represents so large a volume of work that it seems to me that this convention should accept this report and tender to the members of that Committee a vote of thanks for their valuable service in that behalf.

PRESIDENT SCHOLZ: A motion to that effect will be entertained.

JUDGE RICHARDS: Mr. President, in view of the fact that some of us know the great amount of work they have undertaken and accomplished, as an expression of our appreciation of the work they have done, as indicated by this report, I move you that we accept the report as read, and that we express our appreciation of the work of this Committee.

The motion was thereupon seconded, put and carried.

PRESIDENT SCHOLZ: The ayes have it. It is so ordered.

The report of the Committee on Revision of Mineral Land Laws, Mr. E. B. Kirby, Chairman, is next in order.

SECRETARY CALLBREATH: Mr. President, the work of this Committee is also one of very great importance, and if you will permit me, I will make a statement on behalf of the Committee, in view of the fact that the report which they have prepared will not be here until tomorrow, too late, perhaps, to be presented in full at that time to the convention. Mr. Kirby, of St. Louis, who is Chairman of this Committee, has worked very effectively in carrying this matter out. The plan proposed was to ask the Congress of the United States to create a commission which would give hearings in all of the western mining centers with a view to ascertaining exactly what the mining men of the West want with reference to a change in the mining laws. I think it is agreed that every man looks upon some particular phase of the mining laws as being objectionable. It was thought that we might not be able to agree upon just the changes that should be made and therefore it was proposed to have this matter worked out by a commission which should be appointed by Congress who would give hearings and make reports to Congress as to the needs and conditions of the western mining men, in order that the revision might meet the practical situation as presented. Working along that line, a bill was presented last winter, which passed the Senate, but we failed to get it through the House because of the fact that Congress did not feel like making the necessary appropriation for the Committee. The bill provided that members should work for compensation, but that twenty-five thousand dollars should be appropriated, and that the commission should be given the right to subpoena witnesses, so that the poor prospector who could not spare the time to go a long distance to testify as to his needs could be taken care of and the money would be available in the hands of this commission to take care of such matters. That was the plan of the House bill. The Senate bill provided compensation, and of course that had to be worked out in Conference Committee, but this Committee is still working on that plan since that time. All the mining engineers favor it, and I believe that at the next session of Congress we will be able to get a bill approved, and you gentlemen can go to a commission and point out the defects in the present mining law with a view to a revision, which will meet the requirements of the West. Mr. Kirby wired me that his report would reach the convention very shortly, and I hope that we will have it here tomorrow, but I make this preliminary report, knowing practically what Mr. Kirby would say were he here.

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Report of the Committee on Revision of the Mineral Land Laws.

The American Mining Congress inaugurated and has for some years been leading the movement for a general revision of the mineral land laws of the United States.

The present laws framed in 1872 are 40 years behind the times. They have never conformed to the facts of geological structure and are not adapted to present methods of prospecting, developing or financing mining properties. The widespread dissatisfaction of the mining public with them has long been expressed through every means at its command. Judges, lawyers, engineers, geologists and mining men of every class have been pointing out the various faults and evils of the present code. Distinguished men, technical journals, mining and engineering societies have again and again voiced their criticisms and discussed methods of reform, but all without effect upon an indifferent Government at Washington.

There was no relief in sight until the American Mining Congress undertook to concentrate all effort towards reform upon the creation of a commission which should visit the mining communities and secure the results of their experienced judgment as a basis for intelligent revision by Congress.

The movement toward this has steadily grown until the administration and Congress were obliged to recognize it, and last year a bill for a Revision Commission was approved by the Secretary of the Interior and passed by the Senate. A similar bill in the House was favorably reported by its Committee on Mines and Mining, but was hung up by the pressure of other business and Congress adjourned without taking action. Since then the war and its complications have absorbed the attention of Congress, of the administration and of the general public. Under these conditions, it was understood that any effort to push mining law revision at the last session of Congress would be labor wasted and that this reform, like other measures for internal improvement, would have to be held in suspense during the present storm.

Meanwhile, the forces back of the revision movement have steadily grown in strength. The two great organizations of the mining professions, the American Institute of Mining Engineers and the Mining and Metallurgical Society of America, are supporting the movement to the limit of their ability, but the American Institute of Mining Engineers has been restricted by provisions in its constitution which prevented it from taking up public questions. The desire to secure revision, however, was so overwhelming as to raise the whole question of freedom of action for the institute, with the result that the restrictions were removed at the time of its last annual meeting in February and it is now free to devote its energies to the cause.

It is the intention of your Committee not to press matters while the present tension exists at Washington, but to move vigorously in co-operation with the other societies mentioned as soon as the friends of revision in Congress advise that action is practicable. It is now probable that this time will arrive during the coming session. Having so nearly attained success last year, it is intended to press forward at the first opportunity.

The following draft of bill adopted by the American Mining Congress for recommendation to Congress is one which, after several years of experience, was designed to harmonize the many conflicting views and to minimize criticism and opposition so far as possible. It seems to have accomplished this so far as any suggestion to Congress can do so and has been the basis for the actual bills framed by the Senate and the House committees.

Preliminary Draft Suggested for a Joint Resolution of the Senate and House.

That Congress shall undertake a general revision of the laws relating to mineral bearing lands and mineral rights within the United

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States and Alaska and such revision shall cover mineral deposits of every kind except those of coal, oil, phosphates and salines, which have been set aside as the subjects of other and special legislation.

In view of the technical nature of the problems presented by the work, it is desired to secure first the results of the knowledge and experience which exists among those who are engaged in the mining industry.

To this end the President shall, within 60 days hereafter, appoint a commission of five members who shall be selected for their recognized knowledge and experience in the mining industry.

The commission shall consider the mining laws of this and other countries and shall hold public hearings in the principal mining centers of the western States and Alaska, giving full opportunity for the expression of public opinion concerning the problems before it. Its recommendation shall be presented in the form of a fully drafted mining code.

Within six months after the appointment of the commission its report shall be delivered to the President, who shall within 30 days thereafter transmit it to Congress with his further recommendations, if there be any.

Members of the commission shall receive per diem with expenses and shall engage such clerical assistance as may be necessary for the work.

Clause providing for the necessary appropriation.

Your Committee desires to again impress upon the American Mining Congress that the recommendations of the Congress upon any matter, to be effective, must be properly presented at Washington, and this requires steady, persistent work by someone who can stay there. Its Secretary must, therefore, be given the means with which to carry on his work there in the proper way. This is absolutely necessary to supplement the efforts of your various committees who can only act through correspondence and the occasional visits of their members.

EDMUND B. KIRBY, Chairman.

PRESIDENT SCHOLZ: In introducing the speaker this morning, I would like to make a few remarks. When I first engaged in the mining industry some thirty-five years ago, I thought that the most important thing I had to do was to find a mine. I have since that time, however, changed my mind very decidedly, and have concluded that finding a mine was a simple thing, but to operate it and operate it successfully and operate it in keeping with the laws of which there are such a great number, made it necessary that before opening a mine we find a lawyer, because without lawyers we cannot succeed. I am sorry I was not educated to be a lawyer, because I find that lawyers usually get the money and we have the pleasure of doing the work.

The speaker who is to address you this morning is particularly fitted to discuss the subject in hand, because he has given many years of study to the matter. Mr. Rush C. Butler, of Chicago, is, as you will see, a man of very youthful appearance, but his remarks will surprise you, I am sure, because they speak of large wisdom, and indeed Mr. Butler's ability has been recognized by his appointment by the Chamber of Commerce of the United States as a member of its Federal Trade Advisory Committee. I will call on Mr. Butler to come forward and deliver his address, which is entitled "Constructive Regulation of Business—including a discussion of the Sherman Law, the Clayton Bill, and the Federal Trade Commission."

Mr. Butler's address will be found at page 117 of this report.

PRESIDENT SCHOLZ: We have greatly enjoyed the instructive paper prepared by Mr. Butler. I believe there are many in this room who believe that competition is the essence of life, and from those who favor those expressions by Mr. Butler, we will be very glad to hear for the next twenty-five minutes at least, and continued at the afternoon session if we cannot finish discussions of this important subject.

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Just as in certain business lines competition maintains a higher standard, so do we believe it is necessary in the Government affairs that different people express their views in order to improve Government conditions and Government regulations. We would be very glad to hear from anyone present his views on the paper as read by Mr. Butler, and on the subject in hand.

Mr. Saunders, whose name is here on the program, is, unfortunately for us, presiding over another meeting on the floor below, and cannot be present.

DR. DAVID T. DAY: Mr. Chairman, in order to start discussion on this most valuable paper, I would just like to ask one question. It is perfectly evident that in the matter of administering corporations in this country, and maintaining obedience to the Sherman Act and to the Clayton Act, we are putting the industries of the United States under a tremendous handicap which, I believe that the Clayton Act can, if it is properly applied, overcome or aid. We know that our corporations are made to obey the law very well at the present time. The natural result has been to favor foreign monopolies from countries where the monopoly, instead of being frowned upon, is greatly stimulated by the state. I would like to ask what provision is made for the treatment of monopoly products, and for the operations of monopolies, when those products reach these shores from abroad. We know that the present time is extremely favorable for the development of chemical industries in the United States and does not depend upon internal conditions; it depends practically—solely—on the attitude which this Government shall take toward the regulation of foreign monopolies in so far as their products reach the markets of the United States. (Applause.)

PRESIDENT SCHOLZ: Was that a question which you put to Mr. Butler, Dr. Day?

DR. DAY: To Mr. Butler, yes.

PRESIDENT SCHOLZ: Will Mr. Butler favor us with a reply?

MR. BUTLER: Mr. President, I should like to say to Dr. Day that I am not opposed to any law that protects in any way the people of this country against the monopolistic prices or practices of foreign-made or foreign-produced goods. Those goods reach these shores. They can pass through the custom house upon the payment of duty, and I know of no limitation upon that right. I know of no law that reaches the manufacturers or producers of those articles abroad. In general, it is my idea in reply to Dr. Day's question, that while our own manufacturers and producers are subject to the Sherman law and to the two newly enacted regulatory statutes, foreign manufacturers and producers are not.

DR. DAY: Mr. President, I would like, then, perhaps to make my point a little clearer—taking a specific case—of the by-product coke oven people in this country. The producers of oils are capable of turning out any desired quantity of the raw materials for the manufacture of aniline dyes. We could build up that industry slowly, because we are dealing with many hundreds of individual dyes. We have to build up the industry a few dyes at a time. It's the only way, principally because it takes a great deal of skill in the production of those dyes at reasonable prices. Now, the United States chemical industry is prepared to go into that, but they are up against, as we say colloquially, about the hardest conditions that the industrials of a country can possibly experience, and that is, that in Germany—and not Germany alone, but principally Germany—all of these dyes are manufactured, some by one concern and some by another, and where one concern makes one set, it's very apt to be the producer of what they call intermediates, that is, products artificially made, which are turned over to another special factory, and that factory will turn their intermediates to another, so that factory after factory is working in Germany as a sort of network, comprising one establishment, each hand washing the other, so to speak, and co-operating—yes, if you want to term it "co-operating," they cer-

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tainly are "co-operating" to make one monopoly in Germany on the manufacture of aniline dyes, and they are thoroughly supported by the state. Now, what is the effect? Why, suppose we make a given dye? This has been tried again and again. The Buffalo case is the one that is celebrated in this country, where a comparatively small concern set to work to make a certain black dye that was needed in this country, a particularly good one, of course. As soon as that dye went on the market, its price went down, because it could be distributed through many hands. Perhaps they got that idea of competition from the United States at some time or other. I would not be sure that they did not; it sounds somewhat familiar! But at any rate the price of that particular dye in the United States went so far below cost that that factory went out of business before it began, practically. Now that occurs again and again, that just as soon as the United States sends out two or three dyes for sale in the United States the price of that dye drops below all reason in the United States, because that is only two or three of many hundreds, and the loss can be distributed over the others. Now, that is such a flagrant condition in the United States; it's a condition that's going to apply to many others, that in fairness to our own people, it is impossible to try to apply a law here, and not apply it internationally; and if the Trade Commission wants to secure the practical support of the industrials in the United States, that is the thing that must be looked out for. It seems to me I heard a quotation from the law providing for very careful inquiries into the industrial conditions which affect the United States in foreign countries. If I am right in that, let us hope that that will be so vigorously applied that we will look out for the conditions abroad first, if we want to make the reputation of really helping our industrials at home. (Applause.)

MR. IRA J. FRANCIS, Los Angeles, Cal.: Mr. Chairman, possibly I can throw a little light on that problem. Just a few weeks ago the Federal Trade Commission held a hearing in Los Angeles, and the plan of the hearing as outlined by Commissioner Hurley was along identically the same lines you raised, and all the questions were along that line as to the effect of foreign competition on our industrials, and the effect of foreign industrials on those produced in our country. I think that is exactly the line they are inquiring on now.

DR. WILLIAM B. PHILLIPS: Mr. Chairman, I would like to take part in this discussion, because there has arisen in most States a condition of affairs very much to the point. Those who engage in chemical affairs have known for many years we did not produce in this country porcelain which could compare with that of foreign make. I speak particularly of crucibles, evaporating dishes, casseroles and large porcelain dishes used in chemical manufactures. When the war broke out last year, it looked as though some people had had a tip beforehand, because some concerns, we believe, laid in a very large supply. Those supplies lasted until about March or April of this year, when they were so far depleted that you could not get an evaporating dish or casserole or crucible for love or money anywhere. Some people in our State thereupon began to manufacture—began experiments in the manufacture of a crucible casserole and large evaporating dish, which would take the place of the imported ware, and they have met with most remarkable success. They have recently placed an order for sixty thousand pieces with a firm in New York which for the last twenty years has concerned itself with the importation of this material from abroad. They are making a first-class material, and getting the price which formerly maintained for the imported article. For instance, they sell chemical crucibles for eleven cents. They retail at twenty-five cents, and that's been the price for Royal burning crucibles of that size for the last thirty years. Well, what is going to happen when the war breaks? It cannot go on forever. It will not be like the celebrated brook of Mr. Tennyson's that goes babbling on through the ages, but some day or other that war will come to an end. Now, what's going to

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happen in the case of aniline dyes? Dr. Day is perfectly right; we shall meet with such prices as will crush anybody who goes into the business here, and in the case of casseroles, large evaporating dishes, high-grade china and porcelain, these will meet, I think, with the same conditions.

Now, then, we come out from the domain of federal trade relations into that of the tariff. Now, we need not blink at that matter. I don't care whether I address Republicans or good old Bull Moosers or Democrats! (Laughter.) or what it may be; I am talking ordinary common sense. We are coming, after the conclusion of this war, to a very serious condition which only tariff relations can change, or in any wise affect. We may build up these industries now under the peculiar conditions which now maintain, which prevent the importation of a great many articles from abroad. We think we are building up industries in this country to take the place of those, and in some particulars we are. But what's going to be the effect after the war terminates, and this great flood of stuff comes again into our country? Now, where are we to stand? It seems to me that the most important part of the matter, which Mr. Butler has so ably presented to us, is not the trade relations of domestic affairs, but the trade relations of foreign affairs, and that will go into what our old friend General Hancock meant when he said, "The tariff is a local issue." (Laughter.)

I remember a number of years ago I was living in the State of Alabama, and the Wilson Bill—the Wilson of West Virginia—contemplated taking off the duty on coal and iron. Whereupon those good old rock-bound Democrats of Alabama appointed a Committee to go to Washington to protest against this because it would interfere with their business, and the Chairman of that Committee was an old rock-bound Republican, and you never saw such harmony in your life! (Laughter.) The lion lay down with the lamb peaceably, because the lamb was inside of the lion! (Laughter.)

In the state in which I have recently lived—Texas—we had great rejoicing there when something was said about helping the wool industry. The way they helped it was to take the tariff off the wool, and if those people had any other ticket than the Democratic to vote they would take advantage of the next opportunity to vote it.

After the conclusion of this war, we will face such conditions as have not maintained in this country for a great many years with respect to industrials now building up, not those that have been established for years, but those that are building up under war conditions. The manufacture of aniline dyes from coal is one of those industries. The manufacture of high grade porcelain, large evaporating dishes, used in every chemical manufacture in the United States, of crucibles and casseroles, of a dozen things that might be enumerated here—all those come under war conditions, and I would like to ask Mr. Butler, is this new Federal Trade Commission considering the effect of the law upon American business in this particular? (Applause.)

MR. BUTLER: I think the answer has already been made to the question by Mr. Francis, who stated that the commission in its hearing at Los Angeles confined its inquiries almost entirely and exclusively to the foreign trade situation. The hearings that were conducted by the commission, beginning in July in Chicago, extended all over the country west of Detroit, I think, and those hearings had to do exclusively with foreign trade, not only import, but export business. Just what effect the building up of a new industry in this country during the foreign war will have upon the conclusions of the commission in that particular of course would be very difficult to prophesy. The thought occurred to me while Dr. Day was speaking, with reference to the illustration used by him, that it was more a question of tariff law than regulatory law. The industries in this country now building, and into which very high-priced labor must essentially go, will perhaps require special protection, not in a regulatory way, but by tariff law, in order that they may be properly

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developed. I do not want to go into the political situation, but it seems to me that we necessarily must raise these points. I have no doubt the commission in its deliberations and conclusions will point out the relationship existing between regulation and the tariff with reference to imports. With reference to exports, we are not confronted with the same difficulties. There is a very substantial basis for the legal opinion that our laws do not prohibit or inhibit or restrain in any way companies doing business in this country, formed for the purpose of selling goods abroad. In my opinion, the law does not meet that situation as it now stands.

MR. RICHARD MANSFIELD WHITE: Mr. President, when the Federal Trades Commission was in the State of Washington, I attended one of its meetings at Tacoma, before which the lumber men appeared, and the whole burden of their cry seemed to be, "Please regulate us. We want our business regulated." It was an astonishing request to me; it was an astonishing statement to some of the other people there. We thought that the lumber interests were perfectly able to regulate themselves, but if the minutes of the Federal Trades Commission were read before this body here, I am inclined to think that almost every member here would be certainly astonished at the testimony given there in the City of Tacoma regarding regulation of corporations.

My friend from Texas reminds me of another one of my friends from Texas known as "What are we here for, Flanigan?" (Laughter.) The gentleman who first spoke upon this question certainly has raised the tariff question. Let me remind this convention that the reasons why tariff was placed upon imported goods in this country were because of the combination especially made in Great Britain immediately after our War of Independence, and before our War of Independence, to crush out manufacturers—or manufactures made in the colonies and in the United States, and that is the reason why George Washington and Thomas Jefferson both signed the tariff laws. All you have to do is to go back and go into that history, if you want to go into it, to find out the cause for our tariff laws. I remember when I appeared before the Secretary of the Treasury, representing the State of New Mexico—at that time the Territory of New Mexico—on the question of imported ores from the Sierra Mojada range from Mexico into New Mexico—and I want to say in regard to what the gentleman said here, that the corporations obey the laws—they do not obey the laws; they haven't obeyed the laws; they are constantly violating the laws; they are the evil examples of the violation of law. And that's the reason why we are asking for regulation. These corporations were going down into Old Mexico, and importing into New Mexico and into the United States lead ores, and perjuring themselves by swearing that they were dry ores, high grade silver ores, and gold ores, and we had to appear before the Secretary of the Treasury to regulate the matter, and prevent their doing this wrong, doing this evil, to our own people, mining and smelting and manufacturing lead in this country. They were going and making their combinations in Mexico and coming and hurting our trade in the United States. I happened to be the only expert there on our side who had handled the ores in the Sierra Mojada range and in the cars at the smelter as they arrived from Mexico, and was able to give my testimony for the State of New Mexico, being appointed by the Governor of New Mexico to represent New Mexico in the matter. I do not believe in over regulation. Regulation may be harmful just as well as running wild may be harmful. Mr. President, if you want to regulate the inordinate desires of people, why, you want to order and control their honest, straightforward business methods, and no honest man fears rightful regulation. (Applause.)

PRESIDENT SCHOLZ: This subject of business regulation is evoking much interest, but the hour of twelve has almost arrived, and we will adjourn this meeting now, with a view of resuming the discus-

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sions at one of the later sessions. A motion to adjourn this morning session is now in order.

A motion to adjourn was thereupon made and carried.

PRESIDENT SCHOLZ: We will adjourn and reconvene at 12 o'clock.

TUESDAY, SEPTEMBER 21, 1915.

Afternoon Session.

The session was convened at 2:30 o'clock p. m. with President Scholz in the chair.

PRESIDENT SCHOLZ: Gentlemen, the meeting will please come to order. Are there any resolutions to be offered, gentlemen?

JUDGE RICHARDS: The Committee on Resolutions; if they will be kind enough to do so, will meet in the room adjoining at once, in order that we may act upon the resolutions that are now before us.

SECRETARY CALLBREATH (after a pause): The members of the Committee on Resolutions will kindly assemble in the adjoining room.

PRESIDENT SCHOLZ: The next item on the program is the address of Mr. Fletcher Hamilton, State Mineralogist of California, subject, "California's Water Infiltration Law." Mr. Hamilton. (Applause.)

Mr. Hamilton's address will be found at page 131 of this report.

PRESIDENT SCHOLZ: It seems that there are many angles to the oil industry that those of you who mine solid metals and minerals do not know, and I am fully aware of the great importance of the oil industry to this state. The coal mining people have felt the invasion of their preserves by the oil very keenly, and a number of customers to whom we formerly supplied coal, as far west as the Pacific coast, are now burning oil. The filtration of water is helpful to our industry (laughter), because the more water you get the less oil you will have, so it is an ill wind that does not blow some one good. However, for those who have their money invested in the oil industry we want to get all there is in it, and we invite a full discussion of the subject.

PRESIDENT SCHOLZ: Mr. W. A. Williams, Chief Petroleum Technologist of the United States Bureau of Mines, will lead the discussion.

MR. WILLIAMS: I had not realized until now that I was on the program, but perhaps a few remarks concerning the work we are doing in Oklahoma, which is somewhat similar to the work that is to be done in California, may be of some interest to the people here.

About two years ago the attention of the Bureau of Mines was called to the large waste of gas in Oklahoma as a result of current methods of drilling oil wells. The dry hole method of drilling through the formations into the gas without fluid in the hole was in general use, and as a result, when the high pressure gas was encountered as in the Cushing fields, it was impossible to drill through the gas sands until the pressure had been reduced by allowing the wells to waste millions of feet of gas into the atmosphere. Contractors who had been very successful in the eastern fields were in some instances unable to complete their drilling contracts in the Cushing field owing to the difficulties encountered in drilling through the high pressure gas. This was the general condition that existed in the Cushing field when the Director of the Bureau of Mines employed Messrs. Pollard and Heggem to investigate conditions and if possible recommend a practical method of drilling through high pressure gas sands that would conserve the gas and eliminate this enormous waste, and at the same time assure the completion of the wells with the minimum risk to both life and property. The result of this investigation was the introduction of the mud fluid method of drilling.

After considerable difficulty and opposition, it was several times successfully demonstrated that wells could be drilled by the use of mud

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without wasting gas or in any way endangering the lives of the men around the well.

After two years of successful effort on the part of the Bureau of Mines in demonstrating the practicability of the process, the Oklahoma State Legislature, in January, 1915, passed a bill which gave the State Corporation Commission authority to make rules and regulations for the prevention of underground waste, not only of oil and gas, but fresh water as well, and on September 1st, 1915, the Corporation Commission issued rules and regulations supporting the use of mud fluid in drilling through high pressure gas sands.

On October 20, 1915, the Secretary of the Interior approved operating regulations effective on all restricted lands in Oklahoma, which essentially agree with the state regulations, and make a uniform set of operating regulations effective on all oil and gas lands within the state. The state regulations make it compulsory upon the operator to use the mud fluid in certain cases. When the operator fails in his efforts to correct conditions on the lands under the supervision of the Department of the Interior, the inspectors, who are men who have had diversified practical experience in various fields and under various conditions, will assist him in correcting conditions. With the co-operation of the operators the inspectors have been successful in handling some very difficult situations, with the result that waste on Government lands is being reduced to a minimum.

The September issue of the Mining Congress Journal briefly summarizes our work for the past year, and if anyone is sufficiently interested, I would refer them to that journal for additional information.

PRESIDENT SCHOLZ: Gentlemen, further discussion on this subject is invited.

MR. WILLIAMS: I would suggest that the Chairman call on Mr. Pollard.

PRESIDENT SCHOLZ: Mr. Pollard is ordered to the front.

MR. JOHN A. POLLARD (Long Beach, California): Mr. Chairman, I think there are others who are more familiar with the western country. I have been in the East considerably, and other engineers are more familiar with the latest conditions. I would rather hear from them, and I believe they would do the meeting more good than anything I could say.

PRESIDENT SCHOLZ: We will put them all in the trenches, but you may favor us first.

MR. POLLARD: If I cannot get off, then, I may say something. For many years past we have always known that the mud fluid method of drilling, or rather the mud fluid method as applied to well drilling, was one of the best principles that we could use under some conditions. When I first came to California, or rather to the mid-way fields, I was impressed with the conditions at once. The well that I was called upon to take charge of first was in the Buena Vista hills. This well had blown out, and had caused the drillers to abandon the work. They were unable to put the tools back in the well. The result, was that I saw that some of the Texas methods were needed in the Buena Vista hills, and at once started to apply the mud fluid method, with the result that we gained control of the well, and were enabled to drill it down to about twenty-nine hundred feet. This was the first well of the sort in the State of California. I am pretty familiar with conditions, on account of having worked in this state before, and this was the first well of this sort that had been handled in that way. The result was that it caused me to experiment and use this method on other wells which we found were in a worse condition than this, and so when the Bureau of Mines called upon me to go to Oklahoma, I at once endeavored to change the system of drilling from the dry hole method to the application of the mud fluid system to that portion of the well when entering the gas formation, and with this in mind we installed what is known as the mud system as applied to dry hole drilling. It does not really change the method of

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drilling, except when you approach the oil bearing sands, or other troublesome formation. Now this is particularly good in connection with any infiltration of water where you can obtain a hydrostatic pressure of mud fluid on the water-bearing formations. You are going to exclude the water from the hole. You are going to stop the water from getting up to the casing, and hold it back. Your casing is protected from the water, and it is impossible for the water to eat the casing. This will be one of the great benefits in Oklahoma in the lead district, but it is a hard thing to get the men to use it. Whenever the Bureau men come along there are a lot of people who think, "That fellow has been raised in a college, and what he knows about well drilling we do not want to know." So the only way we could prove it to them was to go into our overalls and install the system and show them what could be done, which in many cases we did. We have found that the mud fluid when properly applied is better than anything else we know about. Of course, where there is no solid formation, cement is necessary, but cement, in many cases in California, is not needed at all. The mud fluid will do the work if properly applied, but since lots of men will use the cement, and get by with it, and have success, the next fellow says that he will do the same thing. So they follow the leader, and that's the way a lot of the work is done in the oil country today—a question of following the leader. But I want to say there are lots of cases in the mid-way fields today where cementing is absolutely unnecessary. In fact, if the mud fluid system is applied the mud fluid will protect the upper oil and gas sands which the cement does not touch, and preserve them and other adjacent territory from the waters of those fields in which we are now drilling. I have seen that same thing happen in other fields where the mud fluid system has been applied and it has helped the formations four or five miles distant from where the operations were going on. So I believe, where the mud fluid system can be used, it should be applied. We do not apply it here as we do in Oklahoma. We attempt to do it, but do not carry it out. The boys have not got the real idea of the mud fluid system, and the result is they trust too much to clear water, and the clear water will not do the business, and until they use that method in California they are not going to protect the upper sands where they have three or four sands in one well.

A DELEGATE: Mr. Chairman, I would like to have the gentleman proceed further. This is a delightfully new phase of an important new subject. If he would favor us with a description of what the method is, I am sure it would prove of value.

PRESIDENT SCHOLZ: I was just about to confess that this "slinging mud" business is a new thing to me in every sense of the word, and I know a lot of you gentlemen, like myself, would like to know what it is, and to be told by one who does know just how it is applied, because we may strike oil some day.

MR. POLLARD: Gentlemen, there are many conditions that this mud fluid system is good for. It is particularly good in the coal country, one of the best things I ever knew. I was in Pennsylvania, and gave them a talk on the use of it in coal mining, and it is one of the things that will bring about a unison of coal and oil and gas operators in those states where coal is found. Today one class of operators uses one method, and another does another way, but with the use of this mud fluid method, we are going to get a union between the coal and oil and gas operators that they never had before, for the reason that we can protect a coal mine with the use of the mud fluid like nothing else will do. The idea now is to allow the gas to come from its formation possibly eighteen hundred or two thousand feet, and the engineers are attempting to protect the coal mine eighteen or twenty feet below the floor of the mine. Now, if the gas is corralled at the mouth of the well we have produced a pressure 20 feet below the floor of the mine which should be kept in the strata in which the gas is found. The result is the formation is not sufficiently good to hold it, and we have gas escaping into the coal mine.

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If the mud fluid had been put in behind the casing and kept the gas in the formation in which it was found until it was wanted, and brought up between two strings of casing, then the coal mine would have been safe. Now, I have made those remarks because I understand the Chairman is a coal man.

PRESIDENT SCHOLZ: The question remains unanswered, however.

MR. POLLARD: I am just coming to your point. Now, in regard to the mud fluid method in oil or gas well drilling, we use it in various ways. We make a solution of mud fluid, carrying a consistency of twenty to forty per cent in weight, according to the work we are doing. We drill with this fluid in the hole and thereby exclude all gas or water pressures from the bore hole, as we are going down, due to the hydrostatic head of this tremendous column of mud fluid on the formation. This mud fluid is of so much greater density than the water itself that it pushes the water out of the way and fills up the pores of the formation. That's the system.

PRESIDENT SCHOLZ: The question is, what is this mud fluid?

MR. POLLARD: This mud fluid is composed of a mixture of clay with water, making it any density you want along up to about forty per cent solid, which is about as heavy as we have any need to carry it, and the pumps will handle it at that density very nicely. (Applause.)

PRESIDENT SCHOLZ: If you will pardon me, I will interject a few remarks on this very important subject as applied to the shaft sunk. While in France some four years ago, I visited the largest coal mining district in the North of France. Coal is found at a depth of two to three thousand feet underlying a very porous formation, and in that district the freezing process of shaft sinking was first developed, but they found it very costly, because once the frost came out of the ground it required very strong linings, usually made of cast iron, to hold the soft stratum in place. An engineer, whose name I have forgotten, was the inventor of a process which reminded me very much of the mud process. He sank a drill hole below the measures which contained the water, and without a casing, because the rocks stand very well, and put a pipe almost to the bottom which had a self-locking valve. Cement was poured in this pipe from the surface, or a mixture of cement liquid, which penetrated the fissures of this stratum for quite a distance back. By computing the quantities which were poured into the hole they were able to determine how far the cement work had opened the shaft. The French line of those shafts is about twenty-four feet. They are quite large, according to our way of looking at it, and I was told that they have been able to determine within six inches how far the cement ran out from the center drill hole. Gradually the pipes with the self-locking glands were withdrawn, and increased pressure was applied at the bottom of the shaft. The hydrostatic pressure was sufficient to reach out far enough, and as the pipe was withdrawn closer to the surface, artificial pressure had to be applied. The result was, when the surface was finally reached, a column of rocks cemented together perfectly dry; in fact, it was a cement column in the center of which the shaft was afterwards sunk. It occurs to me that the method which Mr. Pollard has just described is quite parallel to this shaft-sinking process, and the advantage of it, as compared with freezing, is that it costs about one-fourth and requires no lining, because the cement in the surrounding wells was self-sustaining. Therefore, you are able to sink a perfectly dry shaft, but you furnish lining as well, your rock remaining in place with the comparatively small addition of the cement required to fill the crevices. We would be glad to hear some further discussion of this subject.

MR. WRIGHT: Mr. President, I do not rise to make a speech except to say that I think this Congress will lose a great deal by not hearing from Mr. Arthur F. L. Bell, the Chief Engineer of the Associated Oil Company, on this subject. There is no man here any better informed than he is. (Applause.)

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PRESIDENT SCHOLZ: Mr. Bell will now have the floor.

MR. BELL: The question I would like to ask Mr. Hamilton about is in regard to the four deputies that are to be appointed for the various fields. It seems to me that this is an enormous task to expect four men to carry on successfully. I would like to ask whether it is the intention to give these men assistants. As field manager and at present chief engineer of the Associated Oil Company, I know what that task entails, as I have been in charge of similar work.

I am afraid that one of the greatest causes for criticism against this undertaking is going to arise from the delays and expenses incurred by the operators, due to the Bureau not having the proper amount of help to carry on this work of supervision with dispatch; as the work that is necessary to be performed to supervise intelligently the state's drilling operations necessitates so much detail, such as the compiling of the well logs, recording the water cuts, the personal inspection of all wells and the study of many other details, which will require a large staff of assistants.

The Associated Oil Company and the representatives of all the other companies with whom I have spoken on the subject, intend to do everything within their power to make this law a success, and I make this statement simply in the form of a suggestion and not a criticism. I would, therefore, like to hear from Mr. Hamilton in regard to how he intends to carry on this work.

PRESIDENT SCHOLZ: Will Mr. Hamilton kindly respond to Mr. Wright?

MR. HAMILTON: I appreciate Mr. Bell's statement entirely, and in answer to his query, I will say that the Bureau is limited to the amount of funds which it has to expend this year. The funds which will be at our disposal after the first assessment is made will be much more ample than they are now. At the present time, we are operating under an advance from the State Treasurer of twenty thousand dollars, and with that we hope to get the organization in shape, and know just exactly what our problems are going to be, and when that is known the expense will be taken care of by the assessments which will be levied for the care of the department. I will say this, that even at the present time I am considering putting in an assistant outside of the funds at the disposal of the oil department, who will be at work probably in the field itself, doing special work. I realize, the same as Mr. Bell, that there is an enormous amount of work to be done, and the growth of the work will require more men at the disposal of the oil men. We have gone into this work with the expectation that we are going to have the co-operation of the oil men, and it is entirely their law. The department which has been created is a department for the benefit of the oil industry, and that which is of interest to them is of interest to us. We will always be only too anxious to go as far as possible to meet every demand. Fortunately, there is not a great deal of new work going on in the fields in the way of drilling, but if the work increases under the new development, we will have to increase the force to take care of the work. There is no doubt about that.

PRESIDENT SCHOLZ: Are there any other gentlemen here who wish to discuss the oil question?

MR. BELL: There is another question which has just come to my mind in the matter of assessments: Are the assessments to be levied on unpatented land which we do not know whether the government will take away from us? (Laughter.)

MR. HAMILTON: Well, I will say in answer to that, Mr. Bell, that will be a question which will have to come up and be threshed out at the time the assessments are made. The bill provides that the states shall levy an assessment after the first of March, and then we will sit as a board of equalization in the City of Sacramento, at which time the owner of the land or the producer of the oil in the wells has a right to come up and give his point of view, state his case, and if it seems just

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that he shall not be assessed, the assessment will be cut out, or if he comes up and says he thinks he should be assessed more, we will look at it that way.

A DELEGATE: We will have him in jail if he does that! (Laughter.)

PRESIDENT SCHOLZ: Are there any more questions which anyone wishes to ask Mr. Hamilton? He seems to be a bureau of information.

MR. BELL: I would like to suggest that Mr. John M. Wright, who has been associated with the oil business from the time the great California oil development started at Kern River in 1899, is here, and I am sure we would all like to hear from him.

PRESIDENT SCHOLZ: We would be delighted indeed to hear from Mr. Wright. Mr. Wright happens to be an old life member of the American Mining Congress, and is entitled to all the privileges of the floor. We will hear from him now. (Applause.)

MR. JOHN M. WRIGHT (San Francisco): Mr. President, it has seemed to me, in listening to the oil discussion, more than probable that mining men in general know little or nothing about the formations we oil men talk about. I have not heard the word "anticline" nor the word "syncline" nor the word "monocline" today. These are the most familiar terms used by oil men, as they are the most important. Quartz miners may not be aware that an oil mine is very much like a quartz mine; and to digress for just a moment, Mr. Edward L. Doheney and Mr. Charles A. Canfield, the most successful among California oil men, were quartz miners in New Mexico before they became oil men in California, and it was their knowledge of quartz mining formations that made them successful in their early selections of oil lands; and if I may speak of myself, my selection of a piece of oil land that has now some reputation, the Peerless oil property, was made solely upon my study of the formation of the district. I refer to the simple question as to whether there had been any break in the formation between the oil wells that had then already been discovered, and the land I wished to purchase. So you can see that your education as quartz miners is of the utmost value to you, if you desire to become oil men.

An anticline is like this (indicating with hands).

In this case the oil formation comes up from both sides, joining at the top, and the two sides are more or less alike.

A monocline is where you find the oil formation coming up only on one side, frequently revealing the oil itself at the surface. It is like this (indicating with one hand).

A syncline is the low ground between two monoclines, or between a monocline and one side of an anticline, or between the adjoining sides of two anticlines. It is like this (indicating with hands).

Now with this understanding, you may know what the oil man must look for when he goes out prospecting. If he finds the apex—because these oil mines have their apices and their boundaries precisely as quartz mines do—if he finds the apex of an oil formation, he does not sink right there, especially if it is the apex of a monocline, but he goes out on the formation and sinks his well. He may go out on the formation a thousand feet from the apex, he may go two thousand feet, or three thousand feet, as he may decide, and he sinks down hoping he will get oil. Sometimes he does, and sometimes he does not. Probably the times when he does not succeed are much greater in number than when he does succeed.

Now, what I want to get at as quickly as possible is this. Somewhere in these formations, at some depth, the oil man finds water, and I do not know any oil operator that does not use his utmost endeavor to keep the water out of his oil strata. It is his great task, after finding an oil stratum, to keep out or shut off the water. As you know, the forma-

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tion in which the oil occurs, is a stratum of sand or of sandy shale, and so, where the valuable content in a gold mine is fixed, in an oil formation it is fluctuating, it is movable.

An oil mine is a good deal like an ordinary artesian well. The water is found enclosed between two strata impervious to water. You go out on a dipping formation overlying water and sink a hole down through a stratum impervious to water, and the water comes up because its head is higher than the top of the well you sink. And a flowing oil well is very much like that.

But let's go back. You cannot avoid finding water in your oil well, and I think I am warranted in saying that you cannot prevent some of that water getting into your well and permeating your oil sands.

In the Kern River district we have strata aggregating more than six hundred feet in thickness, with alternating clays and oil sands and water sands. You will find a stratum of clay overlying a stratum of water sand and then another stratum of clay. Then you may find a stratum of oil sand, then another stratum of clay, then another of oil sand, and so on. Somewhere down below, there is another stratum of water sand. Now, in spite of all the mechanical ingenuity that can be exercised, the water will find its way from the upper water sand down into the oil sands below or from the lower water sand up into the oil sands above.

I do not understand Mr. Hamilton to imply that the average oil man is doing anything wrong by letting the water into his oil sands, for he knows it cannot be prevented from getting in. It is the great problem we all have to encounter, and it is only the exceptional man who does not exercise proper precautions, and the principal work of Mr. Hamilton's deputies, who have to go out into the different oil fields and take care of this matter, is to look after the careless man and his carelessly handled wells, which are very few in number.

There is no doubt that every superintendent and every driller in the Kern River field will assist Mr. Hamilton's deputy in his effort to shut the water out of the oil wells, and to prevent the further encroachment of water into the oil formations.

On the property of the Peerless Company and on the property immediately south of that, I know that every well was drilled with all the ability and all the knowledge that is today available among oil men. We have selected our superintendents and our drillers with the utmost care, and if they did not understand their business, somebody else would be selected. There are over sixty wells on the Peerless property. Mr. Bell, as supervising engineer for the Associated Company, controls several hundreds in the same district. And there are perhaps sixty or seventy to the south of the Peerless. Now the water got in there, although every one of those wells was sunk carefully and every one of them was watched carefully. It is not a matter of watching every ten feet or every one foot or even every inch, it is every smallest fraction of an inch that must be and is watched. Every moment of time, day and night, the subject is before the superintendents and the drillers, and everything possible is done, as I have said, to keep the water out. But now that it has got in every oil man will help Mr. Hamilton and his deputies to the utmost in getting it out.

I wish to speak of one particular point referred to by Mr. Hamilton. He said that one of the greatest uses of the machinery of his office was to cause a uniform method to be employed in the different fields throughout the state. That cannot be done. No two fields are alike. That is, the underground conditions are not alike in any two fields. The method to be employed in the Kern River field must be different from that to be applied in the Midway field or in the Coalinga field or any other field in the state, because the formation is different, with the strata lying at different angles, in some cases almost entirely flat, and in others at a very large angle.

Now, I will tell you something about what we have done in the

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Kern River field in preventing an increase of the water and the drowning out of our wells, and it came about accidentally.

One day in conversation with a prominent oil superintendent, I mentioned that the Peerless plant was using eight water wells in getting domestic and steam water, and that their cost was five hundred dollars per month, and that I thought one well ought to do the work. He answered, "When you get to Coalinga, go into McQuigg's boiler-house and look at the work of his air compressor." I did so and found a small compressor furnishing all the water needed by McQuigg's plant. The next time I saw Mr. Angus J. Crites, the Peerless superintendent, I said, "I want you to go to Los Angeles to look up air compressors for handling water." He went to Los Angeles, and there made a careful investigation, and on his return he said: "You have to show me, but I am willing to try it." So we got an air compressor and he went to work. My idea was to pump only domestic and steam water. But he reasoned that if compressed air would lift water it would lift oil with it, and so he began his operations at an oil well that had been drowned out with water. I went to the field shortly afterward and I said, "What's that brown stuff on top of that water?" Crites said, "Why, that's oil, and mighty good oil at that." He was getting a thousand barrels of water and three hundred barrels of oil out of a well that had been producing only twenty barrels of oil per day.

Of course the oil men came from all parts of the state to see the thing in operation, and the result has been a gigantic system of air compressors all over the different fields. And by that means, in the southwest portion of the Kern River field we are keeping the water down to a level where it does but little harm. The Associated Company has four compressors, each of which furnishes two thousand cubic feet of air per minute under a pressure of two hundred pounds. Our own compressors furnish an aggregate of four thousand cubic feet per minute, the Monte Cristo has a similar plant and other companies in proportion. And that is the means by which we have prevented the Kern River field from being drowned out, as it would have been save for the mechanical ingenuity of Angus J. Crites.

The compressors, however, do not solve the questions Mr. Hamilton has before him, how to keep the water out of the oil formations, and how to get the water out of the wells after it gets into them, and that is where we are all asking for light. (Applause.)

PRESIDENT SCHOLZ: Is there further discussion? If not we will proceed with the next subject, "The Right of Appeal from Decisions of the Interior Department in Cases Where the Government Is Charged with an Interest," by Mr. H. H. Schwartz, of Portland, Oregon. Is Mr. Schwartz in the room? (After a pause) Mr. Schwartz is evidently not here, and his paper has not been sent in. We will have to proceed to the discussion of the "State versus Federal Leasing of Natural Resources Where Government Control Is Essential to Public Welfare."

SECRETARY CALLBREATH: Mr. Chairman, the general subject which is embodied in these two questions is one of very great importance and I regret very much that Mr. Schwartz is not here. This subject is so vital to the West that we ought to discuss it fully, and understand it. We ought to organize to prevent the adoption of laws which will interfere with western development, and I want for just one moment to call attention to the possible burden which might come upon the Western states. According to the estimates of the United States Geological Survey, there are one trillion, nine hundred and six billion, one hundred and twenty-seven million, two hundred thousand tons of coal in these Western states. If we assume that twenty-five per cent of that coal is available for production that ten per cent of the available supply shall be mined during the next one hundred years, and that it pays a royalty of two cents per ton upon that amount, which is the lowest royalty mentioned in any of the leasing bills considered by Congress —this would amount to a tax upon these Western states of more than

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twenty million dollars each year. If we, in these growing Western states, are to be expected to face a tax of that kind upon our resources, while the cities of Boston and New York, and our great Atlantic seaboard, have the benefit of their great harbor advantages which we cannot enjoy, without any tax by the Federal government, we feel that a burden will be put on the development of the West, which will be unwarrantable. Of course, I realize those figures are exorbitant, and will not ever be imposed, but whether large or small, the tax to be imposed on these states, which is a tax not imposed on other states, is an injustice to the West. (Applause.)

As was pointed out in the official call for this Convention, in the State of Wyoming alone—applying these same figures to the little State of Wyoming—twenty-five per cent available and ten per cent of the available coal mined in the next one hundred years, each year the state would be called on to pay eight million dollars to the Federal government in a tax upon its resources, which the States of Illinois, Pennsylvania and Indiana are not called on to pay, and whether eight million dollars or eight million cents or eight cents, in principle it puts a tax on Western states which is not put on other states, and it is an injustice which we ought to resent and fight to the last resort.

Mr. Chairman, I would like to talk on this thing for a month (laughter), but I am not going to do it. We have in this room a gentleman who was asked to take a place on this program because of his knowledge of Western conditions, and the application of these principles, and I feel we ought to ask him to withdraw his modest declination and speak. I refer to Judge Richards, of Idaho, who was for seven years President of this organization, piloting it across stormy seas, and I ask, Mr. President, that he be requested to discuss this subject without the limit of the five-minute rule which was fixed. (Applause.)

PRESIDENT SCHOLZ: Judge Richards, will you please take the platform and favor us with an address?

JUDGE RICHARDS (taking his position at the front of the room, rather than on the platform): May I just meet the eyes of my audience on the level?

PRESIDENT SCHOLZ: All right.

Judge Richards' address will be found at page 135 of the report.

PRESIDENT SCHOLZ: Mr. Eldridge's name was mentioned as a gentleman who could enlighten us. We would be very glad to hear from him now.

MR. J. B. ELDRIDGE (Boise, Idaho): Mr. President and gentlemen of the Convention: I have borrowed Mr. Bell's cane. Mr. Bell has been so long pointing us to the paths of truth and rectitude that I thought his cane would be helpful in pointing out what I wish to illustrate by this map. I want to call your attention to this map of the best state of all the states—Idaho, where I live.

Thirty-one and eighty-six hundredths per cent of the lands of Idaho are either taxable or they will possibly become taxable lands. A great deal of that area belongs to the state. The state proposes to sell up the land. Referring to the map here, we find thirty-three and twenty-one hundredths per cent of the State of Idaho are in forest preserves. We find thirty and sixty-four one hundredths per cent represented by lands that are owned by the government, and not in forest preserves. Forty-eight one-hundredths of one per cent of the lands of Idaho have been withdrawn for power sites by the government. Under the Carey act fifty-seven one-hundredths per cent have been withdrawn and one and forty-four one-hundredths per cent represents Indian reservations. It will be observed here that Idaho only taxes, and it's only possible for Idaho to tax, this little white area (indicating); so it is with Colorado, Wyoming, Montana, Washington, Oregon, California, Nevada, Arizona, and New Mexico.

I want to support what Judge Richards said, that law should be respected, that we should live under it. When Idaho knocked at the door of Congress, and asked for admission in 1890, it did so because it

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wanted to become one of the great states of the Union. Congress admitted us into the Union upon an equal footing, and upon like conditions, as all the original states heretofore admitted. Idaho accepted that as a binding valid contract. We people of Idaho dreamed dreams of the day when the muddy waters of the Snake River and other great streams of Idaho, too numerous to mention, would be harnessed, and when we could compete with the great State of Pennsylvania; when we might institute and encourage manufacturing establishments in Idaho that would equal any state in the Union. We had a right, gentlemen, to rely upon that contract, and to look forward to the time that we would be able to establish in Idaho some of the greatest factories of this Union, because of our cheap power. In a few years Congress—in violation of that contract—passed laws that enabled the President of the United States to withdraw all of this territory, or a large part of it, under the power of withdrawals. Then came the reservations, one hundred and twenty-five billions of timber—of standing timber in Idaho, nearly all of which is tied up in forest reserves. We fondly love to refer to our mine inspector, the daddy of all mine inspectors—Robert M. Bell—as "Phosphate Bob." Idaho contains already withdrawn ten billions of tons of phosplate—all there is in this country, and nearly all that there is in the world. It's wrong morally and legally for the Government of the United States to deprive Idaho and the other Western states of our natural resources, as was so clearly put before you by Judge Richards. Why shouldn't we have the right to that which all the rest of the Union enjoyed? Why shouldn't we have a right to stand pat upon our contract with the Congress of the United States?

I want to see this resolution passed unanimously, if possible, and let it be passed with a ring, that it may possibly reach the ears of our Eastern brethren, who have enjoyed to the fullest extent the natural resources of their country, and developed them. We do not want to be taxed and hampered so that we cannot compete with the East. We have to send back to the East for all our manufacturing products—and in that connection, gentlemen, I want to say this, insofar as Idaho is concerned, we have more farm land today under water than we can possibly market the products of. We want local development; we want to develop our mines and our resources, so that a farmer can sell the stuff that he raises on his irrigated land. We are from five hundred to two thousand miles from market, and produce is rotting in our fields in Idaho today, because there is nobody to buy it. And yet they say they will take half the proceeds for taxes under the Ferris Bill and devote it to the Reclamation fund. What we want is to develop our own resources, and provide a market for the agricultural products we now have, and put in such other lands from time to time as there is a demand for our products. I thank you, gentlemen. (Applause.)

PRESIDENT SCHOLZ: Before calling for the report of the Committee on Resolutions, I want to announce the Members' Meeting, which will be held in Parlor C on the first floor of the Palace Hotel at 8 o'clock tonight. I want to impress upon every member present the necessity of attending this meeting, because a number of important matters are coming up upon which the members must act.

I want to call attention to the distinction between the "members" and the "delegates." The meetings we have been having have been open to all delegates; the meeting tonight will be particularly for the "members."

Have the Committee on Resolutions anything to report?

JUDGE RICHARDS, Chairman of the Committee on Resolutions: We have nothing to report tonight, but in the morning will be ready with our report.

PRESIDENT SCHOLZ: If there is no further business—

A DELEGATE: I move we adjourn.

PRESIDENT SCHOLZ: We will adjourn until 10 o'clock tomorrow morning.

Whereupon the session was adjourned at 4:55 o'clock p. m.

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WEDNESDAY, SEPTEMBER 22, 1915.
Morning Session.

The morning session of the American Mining Congress was convened at 10:30 o'clock, with President Scholz presiding.

PRESIDENT SCHOLZ: Gentlemen, please come to order. Are there any resolutions to be offered this morning? If so, we would be glad to have them.

MR. F. L. SIZER: Mr. President, I may be out of order, but this is my only opportunity today. I am very anxious to see something done and I would like to know if there has been any committee appointed, or is to be appointed for joint conference with the American Institute in the matter of revision of the mining laws of the United States.

PRESIDENT SCHOLZ: Yes, there is such a committee in existence.

MR. SIZER: Is there any certainty that it will report?

SECRETARY CALLBREATH: We have had a committee for years, and this committee brought about the passage by the U. S. Senate of a bill providing for a commission to revise the mineral land laws, and almost secured its passage by the House of Representatives.

MR. SIZER: I want to say a number of prominent members of the American Institute said to me, although that question was not discussed in any meeting, they were heartily in sympathy with the movement to appoint a joint committee to go to Washington.

I am on the Committee of the American Institute, and there was no report, and all I know is that the Chairman of our committee sent a telegram to the Convention, but that there was no opportunity to discuss it. There was too much pleasure on hand, and much less seems to have been accomplished than here in the Congress, and I believe that if it is in order some resolution could be introduced for the purpose of conferring with the Committee of the American Institute. I believe the men who are actually interested in the matter in the Institute would take it as a compliment, and would be glad to confer with a committee or a sub-committee that might be appointed here today for that purpose.

SECRETARY CALLBREATH: I am sure the committee will be very glad indeed to confer, and if you will kindly furnish the names of your committee, I will put them in touch with you and we will be glad of that co-operation.

MR. WILSON: Mr. Chairman, I do not know whether it is in order at this time, as you are calling for matters in the form of resolutions, to bring to the attention of the Congress, possibly in the form of a motion, a suggestion that favorable action be taken on this letter of the American manufacturers of New York, inviting you to meet in New York next winter, if that is a proper matter to refer to the Congress at this time.

SECRETARY CALLBREATH: Mr. Chairman, may I say that the Mining Congress last night at its annual Meeting of Members decided to give a mining show and exposition in Chicago next year, and we shall hope for the co-operation of all similar organizations in making a great success of that movement. That seemed to be the better place for such a fair or exposition, and that plan has been definitely decided upon by the Mining Congress, and we shall hope for the co-operation of all in connection with it.

PRESIDENT SCHOLZ: The introduction of resolutions will now follow.

The Secretary read resolution as follows:

Resolution No. 4, Introduced by Charles L. Dignowity, of Boston, Mass.

Resolved, That this American Mining Congress, at this session appeal direct to each mining state of the West, that a drastic law be enacted imposing a heavy fine as well as imprisonment for all such person or persons who willfully conceal or cause to be

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concealed beneficial or damaging facts obtained by him or them in regard to any mine he or they have the direct or indirect control or management of, directly or indirectly, whereof they may use such beneficial or damaging knowledge to foster their personal gain or that of their associates, as against the small or scattered stockholders or partners.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 5, Introduced by E. L. Bartholomew.

Whereas, The United States Government, through its Bureau of Mines and Geological Survey exhibits, and technical demonstrations at the Panama-Pacific International Exposition in San Francisco this year, has shown its exceptional facilities for giving the practical miner and prospector an insight into the technical side of their profession which they have long needed and desired; and

Whereas, Some of the state universities, notably those of Arizona, Nevada and Colorado, through their Schools of Mining and Engineering, are offering short courses for miners and prospectors, and

Whereas, It is often very difficult, if not impossible, for the miner and prospector to attend the university for even a short course of study, and

Whereas, Such technical training would be of great value to the practical miner and prospector, enabling them to more readily recognize the rarer minerals which are in so much demand today that they so often overlook, thereby greatly increasing the mineral output of the United States, therefore, be it

Resolved, That the American Mining Congress ask the Bureau of Mines to co-operate with the state universities of the mining states in working out some plan, if necessary involving Federal aid, whereby some part of their courses in mining and engineering can be brought to the miners and prospectors in the field, either through demonstration cars and lectures, as in the agricultural courses, or through correspondence courses, thus enabling the practical miner and prospector to cope with the technical problems that arise in their work, and bringing into closer co-operation the practical and technical branches of the mining profession.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 6, Introduced by A. G. MacKenzie, Salt Lake City, Utah.

Whereas, The Bureau of Mines has in various branches of its service rendered to the mining industry of the United States, during the few years of its existence, such notable and valuable services as to commend it to the people of the United States, and to be of particular service to the mining industry, and

Whereas, the initial appropriation for the Bureau of Mines having been largely for the benefit of the coal mining industry, and for the promotion of safety and efficiency for that branch of the industry, and

Whereas, The metalliferous mining industry has been greatly benefited by the initial appropriation, although this having been entirely inadequate for the solution of many important and pressing problems, which are of such nature that they cannot be solved by the individual or company, but which will be of immense advantage to the industry as a whole; therefore, be it

Resolved, by the American Mining Congress, in 18th Annual Convention assembled, That the importance of larger appropriation for the various branches of the service now being rendered by the United States Bureau of Mines, be urged upon Congress.

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PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 7, Introduced by Dr. W. B. Phillips, of Colorado

Whereas, The work of the United States Bureau of Mines is greatly hampered for lack of funds, and

Whereas, The Bureau has been of the greatest value and advantage to the mining and metallurgical interests of the entire country; therefore, be it

Resolved, by the American Mining Congress, assembled at San Francisco, That the Congress of the United States be most respectfully requested and urged to make such appropriations for the support of the Bureau as may be required for the maintenance and furtherance of its work.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 8, Introduced by Carl Scholz.

Realizing the present unsatisfactory condition of Workmen's Compensation Laws, and for the purpose of simplifying and clarifying relations between employes and employers, as far as affected by this very important feature, be it

Resolved, That the American Mining Congress favors more uniform laws in the various states of our Union, hoping that such standardization will harmonize relations between employes and employers and enable more willing and ready compliance with the statutes.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 9, Introduced by Rush C. Butler, Chicago, Ill.

Be It Resolved, by the American Mining Congress, in 18th Annual Convention assembled, That it pledge its active co-operation with the Federal Trade Commission, and with such organizations of business men as are in sympathy with the Commission's aims and purposes; that it especially commend the suggestions of the commission with reference to uniform cost accounting systems, and expresses its appreciation of this early evidence of constructive helpfulness manifested by the commission toward business; that the Federal Trade Committee of the American Mining Congress be instructed to co-operate with the Federal Trade Committee of the Chamber of Commerce of the United States to the end that the greatest possible good may result from the activities of the Federal Trade Commission.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions.

The Secretary read resolution as follows:

Resolution No. 10, Introduced by Carl Scholz, Chicago, Ill.

For the purpose of bringing more clearly before the people of the United States, not affiliated with or engaged in the mining industries, the vital problems not yet solved; be it hereby provided

That the American Mining Congress again express its willingness and readiness to co-operate with the various branches of the national and state governments, and chiefly the Bureau of Mines, the United States Geological Survey and the Federal Trade Commission, to obtain for the mining industries deserving recognition for those engaged therein; standing on our rights as citizens, we ask for justice and fairness, and with full confidence expect the sup-

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port and co-operation of the American people in the conduct of our business.

PRESIDENT SCHOLZ: Referred to the Committee on Resolutions. Has the Resolutions Committee any report to make?

JUDGE RICHARDS: Your Committee on Resolutions begs to report Resolution No. 1, introduced by the Idaho delegation, with the recommendation of the committee that the resolution be adopted. I move that the report of the committee be adopted.

Motion seconded and unanimously carried.

JUDGE RICHARDS: Mr. President, your committee has considered Resolution No. 2, introduced by Prof. Charles F. Willis, and recommends its adoption. I move that the report of the committee be adopted.

Motion seconded and carried.

JUDGE RICHARDS: Your committee has carefully considered Resolution No. 3, introduced by Mr. J. E. Kennedy, and believes that the American Mining Congress is not in position at this time to make such an investigation of housing conditions as would be useful, and therefore recommends that the resolution be tabled.

PRESIDENT SCHOLZ: Gentlemen, you heard Resolution No. 3, and the recommendations of the committee. What is your pleasure?

MR. UTTER: Mr. President, if I am in order, I will state the committee is in full sympathy with that resolution, but it will be absolutely impractical, as we look at it, to appoint a committee that could go all over the United States and investigate the housing of the different mines at this time. For that reason, it was not approved.

JUDGE RICHARDS: Mr. Chairman, I move that that resolution be laid on the table.

The motion was thereupon seconded, put and carried.

PRESIDENT SCHOLZ: It is so ordered.

JUDGE RICHARDS: Mr. Chairman, may I inquire just when you contemplate adjourning? (Laughter.)

PRESIDENT SCHOLZ: The regular hour for adjournment has been fixed for 12 o'clock, but it seems evident that we shall not finish by that time. Nevertheless, I will suggest that the committee retire at this time, and take up such resolutions as they have, and report on them at noon.

JUDGE RICHARDS: The committee will meet in the room adjoining.

SECRETARY CALLBREATH: Can the committee report at 11:30?

PRESIDENT SCHOLZ: Yes, bring in by 11:30 such resolutions as you can pass upon. We will now proceed to our regular program, which is the report of the Committee on Workmen's Compensation, by Mr. J. W. Dawson, Chairman, of Charleston, West Virginia.

SECRETARY CALLBREATH: That report is not here.

PRESIDENT SCHOLZ: Mr. Dawson's report has been forwarded by mail, but is not at hand. We will therefore proceed with the report of the Committee on Freight and Ore Treatment Rates, by Mr. Imer Pett, of Salt Lake City, Chairman.

SECRETARY CALLBREATH: Mr. Chairman, this report is a very extended, and I hope very helpful, report. It is more or less a general statement of conditions than a report with any recommendation. Heretofore at different times in the history of the Mining Congress, there has been much fault found with the treatment which has been accorded to the mining industry by the smelting interests, and frequently by transportation companies. This report is based upon the theory that at Salt Lake the competition in the smelting field is ample to bring about satisfactory conditions, and that the railroads have been treating the mine owners and ore shippers with considerable generosity. Now, I am just hastily summarizing what this report contains. I do not know whether you care to have it all read or not owing to the late-

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ness of the hour. I do not know whether we should take the time, and it can be in the proceedings, and yet it ought to be passed upon by this Convention.

What is your pleasure? Shall I read it all, or read the salient points in it, or shall we—

MR. BARTHOLOMEW: I move that the Convention act upon your judgment.

MR. MACKENZIE: Mr. President, I am familiar with that report and had something to do with the preparation of it, and I would now move that the report be referred, but perhaps seconding the motion of Mr. Bartholomew and the Secretary's statements, because he summarized briefly what is contained in the report, and let it be contained in the printed report of our proceedings.

PRESIDENT SCHOLZ: Was that a second to Mr. Bartholomew's motion?

MR. ELDRIDGE: Mr. President, it is remarkable, from my standpoint, to attempt to adopt any reports that have not been read. Gentlemen, it is very foolish for you to attempt to adopt something you know nothing about. While my friend, Mackenzie, had something to do with its preparation, all right; he may know something; I do not. On the other hand, it may not agree with my views, and I shall certainly refuse to vote on any report I have no knowledge of.

SECRETARY CALLBREATH: The recommendations of the report are rather short. The balance is sort of history of conditions. I think it would perhaps be wise to have it all read. If the gentleman wants it all read, we will read it all.

A DELEGATE: Just read the recommendations.

SECRETARY CALLBREATH: Read the recommendations of the report.

MR. MACKENZIE: Mr. President, just a word further on that. I was simply trying to save the time of the Convention, assuming that the others would read the report. There is certainly nothing in there the committee wishes to conceal. I would be very glad to have the report read at length, but as the Secretary says, it is long, and I was, in seconding Mr. Batholomew's motion, trying to save time, and thought the gentleman could read it in the printed proceedings.

PRESIDENT SCHOLZ: Gentlemen, you have heard the motion.

SECRETARY CALLBREATH: Gentlemen, I do not like to take that responsibility. Having read the recommendations, I think it would be in order that they be acted on.

MR. WILSON: Mr. Chairman, I move the report be referred to the Committee for further action.

PRESIDENT SCHOLZ: It would seem to the chair that the recommendations having been read, and seeing the salient part of the report, it would be proper for you to act on the recommendations, and either accept or reject them.

MR. WILSON: I will make that as an additional part of my motion.

The motion was thereupon duly put and carried.

Report of Committee on Freight and Ore Treatment Rates.

Salt Lake City, Utah, September 15, 1915.

To the Honorable President and Members of the American Mining Congress, in Convention Assembled:

Gentlemen: Your Committee on Freight and Ore Treatment Rates, consisting of the following members, all residents of Salt Lake City, Utah—Imer Pett, Harry S. Joseph, Geo. H. Dern, W. Mont Ferry, Arthur Thomas—respectfully submit the following report of such consideration as we have given the subject matter assigned to us for investigation. One of the members of our Committee, Arthur Thomas, who was formerly of Salt Lake City, Utah, is not accessible, hence this report has been filed by four members.

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One of the first actions of the Committee was to cause the publication in a Salt Lake daily newspaper of the following:

"UTAH CHAPTER WILL SUBMIT A CONDITIONS REPORT AT CONGRESS.

"Mine operators throughout the State are requested by the Freights and Ore Committee of the Utah Chapter of the American Mining Congress to report to it any grievances they may have in relation to transportation and smelting matters, as the Committee is preparing a report which will be forwarded to headquarters about September 10th. This request was put out after a meeting of the members held in Salt Lake on Thursday.

"The meeting was attended by Imer Pett, Chairman; Harry S. Joseph, George H. Dern, W. Mont Ferry and Arthur Thomas. They had been requested by the Congress to prepare and submit a conditions report at the convention to be held in San Francisco the latter part of September.

"One of the members said yesterday: 'Rumors are afloat in some quarters that the smelters have been actively disposing of ore from their own mines, and that they have refused to buy ores from independent mines, to the great detriment of the independent mine operators. On the other hand, there is an answer that the smelters did not feel like buying ores indiscriminately at prices governed by a spasmodic demand, which was not certain to continue, and which might leave the smelting company with a large amount of metal bought in at a high price, which could only be sold at a price very much less than the ore cost them.

"'The Committee knows of no special instances of complaint in respect to these matters, but, as it is formulating its report to submit to the convention, it would like to have a full and complete report from anyone feeling that he has not received proper treatment at the hands of the smelters or railroad companies.'"

No responses of any kind were received by the Committee.

We have had several meetings and have come to the conclusions embraced in this report. We have divided the subject matter into two parts—first, Freight Rates, and second, Ore Treatment Rates—and have sub-divided each one of these divisions into two parts—first, under Freight Rates, Present Conditions; second, Recommendations; and similarly with Ore Treatment Rates.

FREIGHT RATES.

(Present Conditions.)

We have been in consultation with a great many shippers of ore, particularly of this State, and while in various cases we have heard complaints of excessive freight rates, generally speaking, the shippers seem to feel that, considering all questions involved in the matter of ore freight rates, they are coming to a better understanding with the railroad companies.

In many cases, no doubt, the railroads have been shortsighted in keeping up the rates, and have not given, in certain instances, proper consideration to the applications of shippers. This, of course, has resulted in protest and complaint, but we believe the railroad companies are beginning to realize that mistakes have been made and are ready to listen to reason. Likewise, dissatisfied shippers are beginning to understand that the better way to get lower rates from the railroad companies is by bringing facts, figures and statistics to show that they need lower rates, and also that the lower rates will be of benefit to the railroads.

Your Committee fully appreciates the fact that the railroads have been going through the stress of a very hard campaign, hampered as they have been by direct and indirect legislation, both from State and National Legislatures, and that continued harassments and embarrassments of transportation companies by shippers would only tend to create a wider breach between the companies and their patrons. Some

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years ago this subject of ore freight rates was touched upon by the American Mining Congress, and committees were appointed to formulate plans, and their conclusions were from time to time brought before the Congress for deliberation, but no definite stand was ever taken by the Congress. However, local organizations have been successful in showing the railroad companies that a reduction in rates upon low-grade ores would result in opening up bodies of higher grade ores which would give them (the railroad companies) the advantage and justification of tacking on to the shippers a higher rate than the ore could stand.

As a special instance of this argument, we only have to cite our experiences in the Tintic District of Utah, where rates upon low-grade ores were, a few years ago, materially reduced, resulting in keeping the mines alive and enabling the mine owners to bring to light higher grade ores which, had it not been for the concessions of the railroad companies, might never have been developed. Our local organizations are still at work with the railroads to convince them that a reduction to a still lower level would be of inestimable benefit to the railroad companies in that it would result in increased tonnages and revenues at very little additional cost to the carriers.

(Recommendations.)

We recommend that a broader feeling of amity be established between ore shippers and railroads; that in matters of dispute between ore shippers and railroads co-operation and sound arguments be used instead of threats of adverse legislation, because the railroads are a necessity and instead of curtailing their usefulness we should encourage their development to the end that they may reach every available mining district in this western country.

We recommend further that where small shippers or others at isolated points have grievances of alleged discrimination or excessive freight rates, they communicate with the Local Chapter of the American Mining Congress in their respective localities, which we are sure will do all in its power to relieve their distress if it finds their complaints worthy of attention and consideration, and will constitute itself a medium through which redress might more readily be obtained.

ORE TREATMENT RATES.

(Present Conditions.)

The market prices of all metals have been in such a chaotic state within the last year by reason of the international difficulties, both at home and abroad, that the American miner can hardly sense his present unsettled condition. The violent and broad fluctuations in the prices of metals have at times been very discouraging, and at times very encouraging to the miner. Take, for instance, the price of spelter, which normally, through an average of a series of years, is about 5½ cents per pound, suddenly, by reason of the increased demand, lack of smelting facilities and the inability of mine operators to meet the situation in a hurry, jumped to an abnormally high price per pound, a price unheard of and unrecorded in the history of that metal. Mines which produced a sulphide ore started to increase production, but the smelters were not equipped to handle it. Most of our important smelters have mines of their own, and had contracts with mine operators which had to be lived up to. Lack of equipment and the facts referred to prevented the smelters from taking ores from mine operators who had no contracts. This seemed to work a hardship upon these operators, and even upon larger producers who endeavored to multiply their production many fold to take advantage of the high prices, thus bringing about a condition wherein production far exceeded the capacity of the smelters.

We know of one instance where a certain mining company had a contract for its zinc ores set at a certain tonnage limit. It exceeded the limit by only a few tons, and payment upon shipments of many thousands of tons of zinc was refused, alleging violation of the contract.

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Those who were purchasing zinc in this country for the use of the allied nations at war could not find a means of shipment, and they found themselves with vast quantities of zinc on hand; hence, from the abnormal price referred to above, zinc dropped to a much lower level, so that with an unstable market in zinc as at present, the American mine operator is in a state of uncertainty.

If the abnormal demand for zinc should continue through a series of years, the zinc mine operators will have to wait until there are more smelting facilities afforded for the treatment of zinc ores. In some instances we have been informed that zinc companies are increasing their capacities as rapidly as time and money will permit, and some smelting companies have purchased abandoned plants and are endeavoring to resuscitate them for the handling of zinc ores.

Silicious ores are very much in demand by the smelters at the present time, and we understand they are giving the mine operators reasonable and fair treatment. In some instances, properties which had vast quantities of ore on their dumps and in their mines which was not susceptible to smelter treatment years ago on account of the high charges, today are hauling this ore to market, and it is being handled by the smelters on a very reasonable treatment charge.

As for the future of the silver market, this Committee is in a quandary, and we would like to hear during the proceedings of this convention some discussion by learned economists on what hopes the American mine operator can build his future operations. Periodicals and magazines do not hold out any optimistic outlook for silver during the continuation of the war, and if the condition of a falling market should continue, it is difficult for us to presage what might be the future of some of our silver mines, unless the smelters should be willing to meet us half-way and make a decrease in the smelter treatment of silver ores commensurate with the fall in price; but it might be said that it would be unreasonable for the mine operator to ask the smelting company to bear the entire burden without asking labor correspondingly to bear its share, or even asking the railroad companies to bear their share of the burden.

We have heard no complaints against the smelters since the matter was fully threshed out before a meeting of the American Mining Congress held in Joplin on excessive smelting charges. We are satisfied that the matter of alleged false sampling by the smelters and alleged moisture frauds has been grossly exaggerated. Alleged collusion on the part of the employes of the smelting company to defraud the ore shipper is so practically ridiculous that it is not worthy of attention. Too many confidences would have to be placed in head and minor officials and employes of a smelting company to effectually rob the shipper of one dollar of the value of his ore.

We believe that there is a feeling of good fellowship between the smelters and ore shippers today, such as has not existed for many years; that the ore shipper feels he needs the smelter, and the smelting company feels that it must have the shipper in order to keep its plants alive.

There is one evil, however, we would like to point out which is the foundation of many complaints on the part of especially the small producer and prospector, and we can best illustrate the point we desire to make by quoting an example. A prospector brings a hand sample of ore into a custom assayer. He asks the assayer after the assay has been finished to give him the value of the ore in dollars and cents. The assayer, whether through ignorance or a desire to encourage the prospector, gives him a value in dollars and cents based upon the prices of the metals contained in the ore, without taking into consideration the deductions necessarily made by the smelter for treatment charges, losses in smelting, moisture in the ore, or deductions for freight, marketing and refining the metal, so that when the ore producer referred to ships his ore to the smelter and receives a settlement sheet therefor, he usually

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finds a great variation between the price quoted by the assayer and the price received from the smelter. His first impulse is to charge the smelting company with fraud. In other words, the assayer has given him a full 100 per cent of the gross metallic contents at the point of origin, figured at the price of the refined metal, while the smelter gives him the value of his ore based upon its ability to smelt the ore, to market and refine the metals, and interest upon its own investment.

(Recommendations.)

We recommend that a more general feeling of confidence be exhibited on the part of ore shippers toward the smelters. Where there is any doubt in the minds of ore shippers as to the fairness of treatment, we recommend that they apply to the Local Chapter, which we are sure will do everything in its power to have the matter adjusted. We further recommend that a propaganda be sent out to all custom assayers not to quote to prospectors or small producers who bring in their various hand samples for assay, values of a shipment based upon such assays, unless they are in a position to judge accurately of the smelting charges and the customary deductions from the value of the metallic contents and the metal prices. We would suggest that the assayer, rather than make quotations upon the market value of ores, would refer his customer to the smelter for quotation on such ores as he has assayed.

There is still a great field before the American miner in the matter of treatment of ores, especially the low-grade ores, and those which have been heretofore rebellious. The United States Bureau of Mines, which was brought into being largely through the instrumentality of the American Mining Congress, is doing a great deal of experimental and research work in the line of ore treatment and ore dressing, and we recommend that our members keep in close touch with that department so that they may be fully advised of the advances made in the metallurgical field.

In conclusion, we desire to state that the desire of the railroads for freight business and their further desire to meet the shippers halfway has resulted in considerable of the reductions in freight rates; and that the advance in metallurgical methods during the past few years has similarly brought about a reduction in smelter rates by the smelting companies, which realize that they could ably afford to do so, thus cutting off some of their own profits and giving them to the producer in order to stimulate production. Respectfully submitted,

IMER PETT, Chairman;
HARRY S. JOSEPH,
G. H. DERN,
W. MONT FERRY.

PRESIDENT SCHOLZ: We will now proceed with the first speaker, "The Need of Better Mining Education," by Prof. Charles F. Willis, of Tucson, Arizona. Mr. Willis.

PROF. WILLIS: Mr. Chairman, Ladies and Gentlemen: In the preparation of a paper on "The Needs and Methods of Improvement of Mining Education," I found that the field was exceedingly large, and so this report has become more a summary of what has been done, what portion of the field has been cultivated, and what portion of the field still needs cultivation. I am not going to attempt to read the whole paper, but am going to take portions of it, as I assume those who are interested in mining education will read the whole of it at some future time.

Prof. Willis' paper will be found at page 141 of this report.

PRESIDENT SCHOLZ: Gentlemen, Mr. Willis' paper has been most interesting and instructive, and I hope before the end of the session we will have an opportunity to have some discussion on it. The plan indicated appeals to me, because I have had somewhat similar education, having had to work underground before I went to school. That has proven particularly successful, because it eliminated many men who

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would not have been able to stand the actual work of the mine, and would not have been a credit to the practical end of the work.

The next item on the program is an address by Mr. Otto Ruhl, "The Future of the American Zinc Industry." Mr. Ruhl is engaged in the Resolutions Committee, and unless he comes back, we will have to pass this for the present and take it up later. Mr. Ruhl's address will be found in full on page 183 of this report.

PRESIDENT SCHOLZ: Mr. Ruhl is not in the hall, so we will proceed to the paper by Mr. G. H. Dowell, of Bisbee, Arizona, "The Development of Mine Taxation in Arizona." The paper has been handed in to the Secretary, I believe, but Mr. Dowell might give us a brief resume as to what his paper contains.

Mr. Dowell's address will be found at page 154 of this report.

PRESIDENT SCHOLZ: Mr. Dowell's subject is one which always evokes much interest, because taxes are being raised generally. His advice that we take an active interest in looking after the appointment of the proper commissions is one that I think we should well heed. I think our session at Phoenix last year, perhaps, was quite a help to the Arizona delegates in that respect, and I hope that other States will have profited by it in a similar manner.

One of the most important subjects which the Mining Congress has fostered during the last eight or ten years, perhaps, is the subject of workmen's compensation. It is a matter which comes home closer to us than almost anything else. I think I said at one of the previous meetings that nothing results more in establishing a feeling of confidence and co-operation in any man than the knowledge that his family will be provided for in case of accident to himself. The instinct of the animal is certainly a good example, which we ought to follow, and which employers are generally following. Unfortunately, workmen's compensation has been a political football which has been kicked from corner to corner, and unless strong minds get together and solve this big problem, it will not accomplish what it was meant to bring about.

We have with us this morning a gentleman who is devoting his effort to this subject now, and I will ask Mr. Herbert M. Wilson to present his address on "Workman's Compensation Insurance and the Coal Mining Industry." Mr. Wilson. (Applause.)

Mr. Wilson's address will be found at page 156 of this report.

PRESIDENT SCHOLZ: I am sure I voice the satisfaction of members of our Congress when I say that Mr. Wilson's paper has been most instructive to us, and that we are much gratified to know the stand now adopted by the insurance companies. The merit rating particularly appeals to me, because it places a premium upon careful operation. The old plan of the insurance company was to get as much premium, and pay out as little as possible, resulting in many unnecessary lawsuits, depriving women and children of compensation they were entitled to, and creating, in my opinion, one of the greatest causes of ill feeling that existed between employers and employes. The attitude of the insurance companies, as now explained, is undoubtedly the result of analyses and investigations, and it is truly gratifying to me that they have progressed as other industries have.

The next item on the program is an address by Mr. David Ross, "The New Plan of Mining Insurance."

The address of Mr. Ross will be found at page 163 of this report.

PRESIDENT SCHOLZ: The next address will be by Dr. Frederick L. Hoffman, statistician of the Prudential Insurance Company of Newark, New Jersey.

Dr. Hoffman's address will be found at page 172 of this report.

MR. HARRY L. DAY: Mr. Chairman, I have been very much interested, in the three days we have been in session, in hearing the views of the professional gentlemen who have been devoting their time and attention to the various phases of the mining industry. In particular, the discussion which has taken place in regard to the safety and health of employes has been interesting. Nothing has been said directly, yet

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the inference to be drawn—the general inference is that the despised employer is the man directly or indirectly responsible for the conditions which have been criticised. On behalf of that humble individual, I want to say a word in defense, possibly, or rather in offense. I appreciate it very highly, particularly the very able paper and address we have just heard from Dr. Hoffman, covering the conditions in the mines on the Pacific Coast and in Nevada. I am not familiar with these, but assume they are largely similar to the conditions which prevail in the quartz mines of the coast. I am familiar with conditions in Washington, Idaho and Montana, and I am obliged to disagree radically with the conclusions which have been drawn by some of the professional gentlemen who have spoken here. In the first place, I want to make the assertion, with all the emphasis possible, that the attention has been entirely misdirected. You have not got at the root of the trouble. The Anaconda Mining Company, as you all know, is one of the biggest companies in the world, and is employing a force of ten thousand men in the mills and reduction works at Butte, Montana, and one of the most intelligently managed concerns in the country, and its employes receive the highest wages in the world—always have, and probably always will. Underground conditions there are in many respects good, and in some respects are bad, owing to local rock conditions. Now, the management are just as humane men as one will find anywhere. It happens the vice-president of the company is Mr. Kelley, who worked his way up from a poor boy to his present high position as vice-president of this great company, and has lately moved to New York to take a step higher up. He started in as chain man, and what we call a nipper, carrying tools in the mine. He earned enough money to educate himself, and read law, and graduated, and took a splendid position with his company, and now, as I say, is in entire charge of its work, and knows the game from top to bottom; one of the most humane and helpful mining men in the world. He established some time ago a department of safety, with a special engineer in charge of that department, who does nothing else but work day and night on the problems of increasing the safety of the men and safeguarding their health. They keep exact statistics on all these matters. Their experience has been that approximately—this is subject to a slight change of the pen one way or the other—approximately two-thirds of all the accidents to the men are caused by the willful carelessness or criminal negligence of the individual himself. Now, those are the figures, and I again say that in my observation they have been substantiated. We are astonished ourselves to find how little the fault is with the employer, and how little with the natural hazard of the business.

Now, gentlemen, I want to call all your attention to this point, and ask you to devote your attention to that, and give us the solution along that line: What do we do if the soldier on duty violates an order? He is punished for it, and severely. If a citizen disobeys the laws of his State, or even the warnings of a crossing policeman, he is guilty of a misdemeanor, and may be haled into court. Something is done to him. But we have no power in the world to punish a miner who deliberately violates the rules and regulations of a mine and causes an accident to himself and perhaps to others, except to discharge him, and that's no penalty, because he goes next door and gets another job, and the man who takes his place does just as badly. We have no way of punishing them for disobeying the rules. We cannot enforce those rules. We have made rules until the cows come home, and they do no good. We punish them—the careless and reckless men—by discharge, but cannot stop it. There is the main taproot of all this evil, and until we find some method of punishing the men for disobeying the rules and regulations of the mines, thus causing disaster, I do not know how we can find a remedy for the general conditions. I tried to secure the insertion in our compensation law of a clause that one-eighth of the indemnity should be paid by the employes themselves, deducted from the pay rolls,

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and paid into the fund. I could not get it in the law, which was vetoed by the Governor of Idaho. The State of Oregon has a law which includes that feature. There a commission investigated the subject of compensation—an able commission, composed of nine very able men in Oregon, and after two years of very earnest effort they brought in a report saying that the large proportion of the accidents were caused by the workmen themselves, and they should, in all fairness, be bound to pay a portion of the indemnity, and put it in the recommendation, and it was made law. We have not got that far in Idaho, and I do not know any other State that has gone that far.

Now, I want to say, in my observations, I believe the employers of California, as well as other States of the West, are as high-minded and earnest men as in any line of business or industry. The fatalities in mines, the accidents, and the diseases incidental to that business, are matters of deep concern to them. There is nothing so grievous to the management of a mine as an accident, nothing—fire, flood or accident of any kind that destroys property—is as nothing to the destruction of life and limb, and those of you who have had experience and had the load of responsibility can substantiate my words in that regard. In the Coeur d'Alene country I want to say that we are co-operating very harmoniously and satisfactorily with the various bureaus of the Government, which are working along certain lines, and certain other lines we are not co-operating on so harmoniously. I want to point out a few details, such as these: On the twelfth of this month there was held in Wallace, Idaho, a competition in the rescue methods which have been sought by the Government. There has been in the district for several years a rescue crew, so called, in charge of a foreman, and a crew of expert instructors, who go around to the different mines and drill the men in rescue work, and on the twelfth of this month there was held a competition at Wallace, in which eighteen mines participated, and which was very interesting. The mines had gone to considerable expense to drill these teams and attach them to this duty, and very cheerfully equipped them with the latest apparatus which the department recommends—pulmotors, and helmets, and other apparatus of technical kind which I cannot think of at present. They have also, in connection with the forest reserves, a system whereby the lookouts locating the fires have only to telephone the nearest mine when a mine crew will be detailed for that duty, and sent to put the fire out under the direction of the forest people.

Now, on those issues and similar matters, we work very beautifully with the bureaus. On other matters we are at loggerheads. I might mention one of these, and that is, a method which has been modified lately, and to good advantage, I think, with the rise of the forest reserve situation. We found there that in securing patents for our mineral lands, there arose a situation like this: Some rule or order was promulgated somewhere, whereby we were prevented from securing a patent or a claim passed for patent until the forest reserve people had approved the validity of a mining location. It worked out that some young gentleman, no doubt a very able young man from the forest reserve school at Yale, or some other part of the country, who had never worked underground, and would not know ore if he saw it, came and said, "Gentlemen, where is your shipping ore?" (Laughter.) Lots of the claims did not have any. You mining men know the bulk of them do not. For years it resulted in the hold-up of a great many meritorious claims. So intense was the indignation, and so just the protest, that the department has finally modified that practice by putting in those places competent men, and have thus removed much friction in that regard.

Perhaps I have digressed a little from the original proposition of safety, but it all comes up this way: The main point I wanted to get at was the drift, conscious or not, into laying all this criticism upon the owner—whether company or individual, it does not matter—without

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regard to the responsibility on the other side. The owner has done, from my point of view, more than anybody else. He pays the bills, takes the responsibility, and has to see that the pay roll is all ready, and waiting, and the men, engineers and all, take their per diem and walk away with it, but he is there to meet the thousand and one trials that come upon him.

Now I contend, gentlemen, that the tendency of all our work of late years, and this new legislation, has been to shoulder an undue share of the responsibility on the employer, the fellow who takes the long chance, and this tendency is largely responsible for the present apathy in sections of the West in the mining business today. It is a hazardous business, not only to life and limb, but to capital and reputation; and if you are going to weigh down the industry with an enormous handicap of legislation, you will complicate matters. You must pay for it in reduced business. Who will take these chances and carry the load? The company I represent today employs twelve to fifteen hundred men, and we report to fourteen different departments of the Government in detail. Ten or twelve years ago we made no such reports at all. It complicates the matter of securing capital, of giving the investor a fair return for his money, and complicates the mining situation with all his relations, with his business and with the Government. We have to pay a big price for these things. That price should be distributed, it seems to me, in a little wider range, and I want to call attention again to that particular matter of the responsibility for this enormous waste of human life and limb, which the gentlemen have referred to, but which is really to be charged to the account of the workman himself.

Now, how are we going to compel them to take care of themselves, because underground the man must take care of himself. I would like to ask Dr. Hoffman, who spoke last, on what basis his classification per thousand accidents is made?

DR. HOFFMAN: The statistics quoted were crude rates based upon the average number of men employed. To be absolutely correct, the rates should have been reduced to a standard basis of three hundred days' work. In the comparison made such a correction, however, would not have very materially changed the rates in question. It, however, would have changed the comparison materially if a contrast had been presented between coal and metal mines, since on the average the working time in coal mines is probably from fifty to sixty days a year less than in metal mines, and the actual time of risk exposure is, therefore, less per annum in the former than in the latter. According to the U. S. Bureau of Mines, during 1913 the standardized fatal accident rates, reduced to a 300-working-day basis, are 3.72 per 1,000 men employed for American metal mines, and 4.70 for American coal mines. The average working time during 1913 for American metal mines was 285 days, and for American coal mines, 238 days. The respective crude rates—that is, without correction for differences in working time—are 3.54 per 1,000 men employed for metal mines, and 3.73 for coal mines. Since there are no coal mines in Colorado or Nevada, it would not seem necessary in the present case to reduce the crude rates, based on the average number employed, to the standard basis of 300 days' work.

MR. DAY: That is the information that I sought. I believe that the figures are approximately incorrect, and that weighs severely on the metal mines; for that reason, I can only speak from my own experience, that we work very steadily in our country; we average three hundred and fifty shifts per year. We shut down only on Christmas and the Fourth of July. We have an eight-hour law, and our men do not want to lay off on Sunday.

In this connection, I might relate an incident that happened to a member of this Congress, Mr. McCarthy, President of the Hecla Mine, employing two hundred and fifty men. Mr. McCarthy is a kind-hearted gentleman, who is desirous of doing what he can for his men. He

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has put in a gymnasium, and the mining and boarding houses are furnished with various kinds of baths, steam heat, hot and cold water, electric lights, telephones, and just about as much as anybody would want—and they should have these things, for they are good men. He took a vote to see whether they would shut down on Sunday. What do you imagine was the result? Ninety per cent of the men were opposed to shutting down on Sunday. This was done in response to a protest from the clergymen of the district, who said the mining men were responsible for loss of interest in religious matters, and those men were given an opportunity to decide for themselves whether or not they should get off from their work on Sunday, with the result I have indicated. What is a mine manager going to do under those conditions? He cannot force the men to do that. If he shuts down the works on Sunday, the best men will leave. The miner wants to work three or six months or a year—and commonly a year—and then go and take a trip, perhaps to the fair, or some place that suits him; but he does not want to pay board for seven days and work six.

Those are practical matters with me. That is but one, but we might suggest dozens of them every day, and it seems to me very largely overlooked by the gentlemen who are so keenly interested in all these matters.

There are two sides in all these things, and the human equation is a large factor in it. If some of you gentlemen will suggest—I have devoted much attention in a practical way to this, to the question of how to discipline the men, but if you can suggest a means whereby the men can be brought to observe the rules and regulations, I should be glad to hear your proposal. In the mines which I referred to in the Coeur d'Alene country, particularly those in my charge, every workman on the work is given a printed set of the rules governing his work there. He is made to read it in the presence of the timekeeper, and to sign it, if he can, and must state that he has read and understands and agrees to carry out the rules to his best ability. It does not amount to anything, because we cannot enforce it. But the rules are the result of the best thought of the best mining men of the country and the various bureaus of the Government.

I did not mean to take up so much of your time, but I have given so much thought and attention to this matter, and I feel so strongly upon the subject, that I had to get it off my chest! (Laughter and applause.)

MR. WILSON: Mr. Chairman and gentlemen, I feel it is almost an outrage to trespass further on the time of this Congress, but as the gentleman who has just spoken asked for certain information, I do feel there is one point that I should make answer to, especially in behalf of those who are not present, but who are perhaps referred to in Mr. Day's assertion that the scientific men who are discussing questions of safety in mining statistics in regard to mine accidents seem to lay all the burden on the operator and overlook the fact that the miner is largely responsible for these accidents, due to his willful carelessness and criminal negligence. Were those not the words?

MR. DAY: Yes, I think they were.

MR. WILSON: Now, as the speaker also said, there are two sides to every question, and there are two sides to this question. He has seen one side of it. He appears to have overlooked the fact that some accidents are also due to the operators.

As to the charge that the statisticians have laid the burden of responsibility of accidents on the mine operator, I think the gentleman is mistaken. I do not think it was the intention of any one of these men to do so; certainly not the men in the Bureau of Mines. In their studies they always appear to be most sympathetic with the mine operators, as well as with the men in the mines. They may not care to say so, but they are more sympathetic in many cases, I believe. I am sure that is true with the insurance people for whom Dr. Hoffman speaks, because it is from the mine operator that the insurance interests expect to

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get their business, and they appreciate his side much more than they do the side of the men who work in the mines. They do not lay the blame on the operator. I believe they know he is doing the most he can, as the speaker said, to better conditions as far as he knows, and in that statement lies the crux of the whole proposition—in so far as he knows.

In the case of great mines like the Anaconda, which the speaker quotes, it goes without saying that the mine operators have done all they can for the comfort and safety of the men.

The best examples we have in the United States of safety for the employe are to be found in the U. S. Steel Corporation. I will not hesitate to laud the Steel Corporation here or anywhere. They are spending nearly a million dollars annually in safety. They are leading everybody in showing how to be safe in their operations, and so I find it also even in the much abused Rockefeller mines in Colorado—the Colorado Fuel and Iron Company. I can mention a number of the anthracite coal operations where this is also true. Surely in these cases as in many others it is an absolute fact that the operators are doing everything they can to better the condition of the worker.

But as Dr. Hoffman said, it is not the big operation, but the small operation, where the trouble lies. The ignorance is not willful, but simply natural ignorance. I have met foremen and superintendents who talked safety all the time, and meant it, but did not realize the means for obtaining that safety. They did not know they were unsafe in the operation of their mines.

As for the other side of it, the mine workers', the mine worker is the chief cause, as the speaker said, of accidents in mines. He accounts for two-thirds of them nearly. Dr. Hoffman is much better aware of this than the speaker, because he is a great statistician. So, also, the Bureau of Mines and the insurance people have taken account of these things in fixing insurance rates. There is always an allowance made for the irreducible minimum. They assume that the physical hazards of the mines cannot, as you may know, all be removed. About two-thirds or 66 per cent of the causes of accidents will remain. They are due to the hazards of the industry, not to the physical hazards of operation. You cannot, in other words, remove more than one-third or one-half of the accident causes. The others remain.

These, however, are due, not, as the last speaker said, to the willful carelessness and criminal negligence of the employes, but to that class of carelessness which we are all guilty of at times. The gentleman, himself, if he owns an automobile, probably knows the traffic rules, but he comes to a policeman at the street corner who has his hand up, indicating that the driver must slow up. But the latter is in a hurry, and he thinks, "Well, I will take a chance and cut by this time," and he puts on speed and dashes by the policeman, and hurts somebody! (Laughter.) He will do a hundred things thoughtlessly, carelessly—we all do. I do them, and you do them, because we are not thinking at the moment, or I decide to "take a chance." I do not think it is right, therefore, to charge the miners with willful carelessness every time they do the wrong thing, as they so often do. In every industry that you and I might mention, the employes every day of their lives take chances involving their own safety and that of others, and I want to defend them only to the extent that I do not think it is right to charge all cases with criminal or willful intent.

DR. HOFFMAN: Mr. President, I may say as regards the cost of compensation and its relation to the mining industry, that it probably will not exceed ten cents per ton of ore produced, and the rate can be reduced considerably if the management will put into operation mechanical precautions and effective safety devices that will make a large number of present-day accidents practically impossible. The fact is often overlooked that a man who works every day at exactly the same kind of hard physical toil cannot concern himself constantly with

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matters of personal care and safety precaution. Much of what looks like criminal carelessness or recklessness is largely a matter of natural indifference resulting from the conditions under which underground work requires to be done from eight to ten hours every day throughout the year. We are apt to err seriously in our interpretation of the terms of thought in which workingmen view their relations to the hazardous work that requires to be done. I have discussed this matter with hundreds of men underground, and have observed them carefully over and over again, and I have come to the conclusion that it would be utterly impossible for them to do their work, and to do it in the way in which it alone can be effectively done, if they were to be constantly aware of the ever-present possibilities of an accident, from the most insignificant to the most serious and fatal. Many of the accidents that occur are, properly speaking, inherent in the industry, or in the conditions under which the work is done, with a due regard to economic considerations. Many of the accidents, however, are directly attributable to indifference on the part of the management in permitting the continuance of conditions which are obviously an encouragement to the taking of chances on the one hand, and the occurrence of accidents on the other. As I have said before, I have observed for myself the neglect in the case of ladders, which often fall lamentably short of even primitive safety-first considerations. The foremen knew the ladders to be bad, the general manager also knew the facts, but the responsibility is placed upon the workman, and under the old employers' liability law the consequences of managerial indifference would be made to fall upon him alone. It is easy enough to say that a man ought to have known better than to take chances, but it is all in the day's work, and the first and fundamental duty of accident prevention rests upon the management. Until within very recent years few underground workmen were thoroughly instructed in safety-first principles—in fact, the taking of chances was rather looked upon as praiseworthy and deserving of special recognition. I do not hesitate to put myself on record in the statement that it is wrongful and extremely dangerous for any management to shift the responsibility for mine accidents upon the workman, who no doubt is often to blame in the taking of needless risks, but the taking of such chances can be made practically impossible by more careful underground supervision and a more general installation of approved safety devices. Much has been done within recent years to raise the character of the men and to interest underground employes particularly in matters other than wages and hours of labor. I wish on this occasion to pay a tribute to the U. S. Bureau of Mines, and the late Dr. Holmes, in having done infinitely more in a very few years in the raising of the morale and intelligence of the men working in the mines than the mining companies have done in the entire history of the industry. I have reference here chiefly to first-aid and systematic training in rescue work. It must never be forgotten, and the fact cannot be too often put on record, that the modern safety-first movement in mines practically coincides with the advent of workmen's compensation legislation, and that the best work in the direction of accident prevention and improved sanitation has been done in the States where workmen's compensation law has placed the responsibility for carelessness and indifference directly upon the mine operator, where it belongs. It is largely to the credit of the U. S. Bureau of Mines that modern safety and rescue work in this country has been raised to a standard comparable with the best that is being done in European countries, but it also requires to be said that the admirable results would not have been attained but for the hearty co-operation on the part of mine managers and mining men. Within a few years we have developed in this country perhaps as fine a group of mine rescue teams as is to be found anywhere in the world, and no words of mine can adequately express my belief that by this effort alone the moral level, the moral standard and ideals of mine employes have been materially raised to a point where

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it may safely be asserted that the miners themselves are doing their share to prevent needless accidents to life and limb, or needless property destruction caused by their carelessness. In the light of my own extended experience, and personal acquaintance with miners throughout the country, I am absolutely convinced that these men, as a class, cannot be charged with criminally imperiling their own or other men's lives, or the property interests with which they are connected. I repeat, that in my opinion the primary responsibility for the majority of underground accidents rests with the management and not with the men. (Applause.)

MR. DAY: Mr. Chairman, possibly I may have the privilege of just a few moments in closing. The gentleman seems to misapprehend me somewhat. I have no intention of criticising the work of the Bureau, but to point out—and their own figures substantiate it, and their own assertions—that two-thirds of these accidents are caused by the carelessness, willful or criminal, of the men themselves. I think that we all appreciate the good work that has been done. We are all here to testify to it, and have been co-operating with it for years. Regardless of what the gentleman has observed, I want to reaffirm my original declaration from experience as a prospector and mining man—for thirty years a practical man, believing I know what I am talking about. I do not go underground in my properties once without finding the best miners in the world willfully violating the rules, and I call them down in no uncertain language, and they laugh and say, "It is on us. We didn't know you were coming around." I find them working under loose ground, or carrying a bar close up against a trolley wire, but if the bar would touch the trolley wire for an instant it would probably mean death to the man carrying it.

DR. HOFFMAN: Why call that willful or criminal?

A DELEGATE: What is it, if it is not willful or criminal?

DR. HOFFMAN: Ignorance.

PRESIDENT SCHOLZ: The gentlemen are digressing and engaging in general discussion, whereas one gentleman who has the floor should maintain it and finish. There should be no interruptions.

MR. DAY: Mr. Chairman, I am going to stop right now, not because I have no more to say, but because there is no time to continue this discussion longer. I thank you. (Applause.)

SECRETARY CALLBREATH: Mr. President, we have a number of resolutions here that need attention. We have another paper that ought to be heard, and it is long after the time of adjournment. Shall we adjourn and have another session this afternoon, or cut off the debate at this point, proceed with our program, and finally adjourn at the end of the present session?

MR. ELDRIDGE: I move we adjourn to meet at 2:30.

The motion was seconded.

PRESIDENT SCHOLZ: Before the motion is put, I would like to say that the discussions this morning have been very interesting, and it is quite gratifying to me that we are exceeding our program, but I want to be dead sure that we will have an attendance, and in order to be quite sure that is the case, I am going to ask for a rising vote, and all gentlemen who rise and are not here will be duly penalized!

All the gentlemen who will attend this afternoon's session at 2:30 will please rise to their feet.

A rising vote was thereupon taken.

PRESIDENT SCHOLZ: Those who will not be here this afternoon will please rise.

A DELEGATE: Let's continue in session and finish up the business.

PRESIDENT SCHOLZ: If that's agreeable, we will continue in session, and make our remarks as short as possible, and get through.

A DELEGATE: Mr. President, I just want to coincide with the remarks of the gentleman. I believe this "safety-first" movement has

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been one of the greatest things the mining industry has had; it has been a Godsend, in that operators, as well as men, for the past two or three years, have taken it upon themselves to look into these questions, doing all in their power to prevent accidents. But, as the speaker to my left remarked, we find it is a fact that the great majority of accidents are due, not to the negligence of the operator, but to the carelessness of the miner.

Now, as to a remedy: We go so far as saying, "If you will let us make the mine 'foolproof,' accidents will be minimized." Now, that is the slogan that a great many mines or operators are using today, making their mines "foolproof," but even at that, at the end of the year we find accidents, and if we will look over the causes of those accidents on the reports, as you say, we will find 60 per cent of them are due to the carelessness of the miner, and it is a question, and I am glad that it was raised, what to do to eliminate the carelessness and negligence of the miner.

I would like to hear more on that point, because it is one of the things we should get at—how to avoid accidents, how we shall avoid accidents so as to reduce the negligence and carelessness of the miner to a minimum.

PRESIDENT SCHOLZ: Gentlemen, we will now hear the report of the Committee on Resolutions.

JUDGE RICHARDS: Resolution No. 4, introduced by Charles L. Dignowity. The Committee recommend that the resolution do not pass.

A DELEGATE: Can we hear it read?

THE SECRETARY: Read the resolution.

DR. HOFFMAN: The Committee believe that general State laws are being passed, and the past recommendations of this Congress are sufficient without this resolution.

PRESIDENT SCHOLZ: What is your pleasure, gentlemen?

MR. UTTER: I move that the report of the Committee be approved.

The motion was seconded, duly put and carried.

PRESIDENT SCHOLZ: It is so ordered.

JUDGE RICHARDS: Resolution No. 5, introduced by E. L. Bartholomew. Your Committee recommend the adoption of the resolution.

I move the report of the Committee be accepted.

The motion was seconded, put and carried.

JUDGE RICHARDS: The subject matter of Resolution No. 6, introduced by Mr. A. G. Mackenzie, has been included in Resolution No. 7, and your Committee therefore recommend that it be tabled.

JUDGE RICHARDS: I move you, Mr. President, the report of the Committee be accepted.

The motion was seconded and carried.

JUDGE RICHARDS: Resolution No. 7, by Dr. W. B. Phillips. Your Committee recommend the adoption of the resolution. I move the adoption of the report.

The motion was duly put and carried.

JUDGE RICHARDS: Resolution No. 9, introduced by Rush C. Butler, of Chicago. Your Committee recommend the adoption of this resolution, and further recommend that the Board of Directors consider the wisdom of placing on the program of the 1916 Convention the question of the creation by Congress of a permanent non-partisan tariff board to investigate and recommend measures as will protect the mining and chemical industries.

Gentlemen, you have heard the recommendations of the Committee, and its resolution.

A DELEGATE: I move the report of the Committee be adopted.

The motion was thereupon duly put and carried.

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JUDGE RICHARDS: Resolution No. 10, introduced by Carl Scholz, of Chicago. Your Committee recommend its adoption.

MR. WILSON: I move the adoption of the report.

The motion was seconded, put and carried.

PRESIDENT SCHOLZ: It is so ordered.

SECRETARY CALLBREATH: Resolution No. 11 has been introduced by Mr. John P. Reese. I will read the resolution.

Resolution No. 11, Introduced by John P. Reese, Gillespie, Illinois.

Whereas, The coal industry of many of the eastern and central States have wage contracts which expire on March 31st next; and

Whereas, The consumers of coal have frequently been greatly inconvenienced and unnecessarily financially burdened as a result of the delay and uncertainty in connection with the making of new contracts; therefore, be it

Resolved, By the American Mining Congress, in Eighteenth Annual Convention assembled, That the officers of the Coal Operators' Association and the Miners' Unions in the States and districts affected be requested to open negotiations for a new contract not later than January 1, 1916, with a view of saving the consumer the unnecessary burden of stocking coal.

DR. HOFFMAN: As it is too late for the Committee on Resolutions to consider that, I move you the suspension of the rules, and that the house itself pass on it.

Mr. Wilson seconded the motion.

PRESIDENT SCHOLZ: Gentlemen, you have heard the resolution. What is your pleasure?

The question was called for.

The motion was thereupon put and carried.

PRESIDENT SCHOLZ: What is your further pleasure with regard to the resolution?

MR. WILSON: I move its adoption.

A DELEGATE: I take it the resolution is satisfactory to the coal men present.

The motion was thereupon duly put and carried.

A DELEGATE: Mr. Chairman, if in order, I would like to offer a little bit of a resolution that will cause no debate. If you can get some suspension of the rules, I would like to have it done.

PRESIDENT SCHOLZ: All right, we would like to comply.

A DELEGATE: The discussion has developed a fact of great interest this morning, that certain mine operators are receiving from the National and State Governments together some fourteen questionaires which must be answered. That's a very serious matter, and one due to many things, and particularly due to the fact that the mine operators insist that the questionaires sent into one branch of the Government shall not be used in another branch. For example, a statement to one bureau shall not be used by the Internal Tax Commission or Bureau of Corporations; therefore those bureaus must send out others. Fourteen questionaires is outrageous! Therefore, I would move the appointment of a small special committee of this Congress to co-operate with the National Government in reducing the number of inquiries to be sent out to the members—a committee of, say, three, to be appointed by the chair.

A DELEGATE: Mr. Chairman, I take pleasure in seconding that, provided I be not put on the committee. I really believe there is a chance to simplify matters a little by standardizing the form.

SECRETARY CALLBREATH: Mr. Chairman, permit me to say we already have a committee working on that very subject, in the hope of not only standardizing the reports to the Federal Government, but also the various States, and expecting the States to adjust their requirements so as to make one report from one company at one time to meet

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both State and National requirements. I think that committee fully covers the suggestion.

PRESIDENT SCHOLZ: If the Major insists, we will put it to the house.

A DELEGATE: No, it is taken care of already.

PRESIDENT SCHOLZ: Absolutely; it has been worked out quite a while.

I want to apologize to one gentleman in the room who was not here when called on, and to whom I think we owe a great deal. I have never met the gentleman before, but his work stands out pre-eminently, and has proven as inspiration to the mining industry. I refer to Mr. Otto Ruhl, of Missouri. If I can ask indulgence for at least three or four minutes, I am sure the time will be well spent if Mr. Ruhl will give us at least a brief resume of his address, with the expectation of having it supplemented, and an enlargement to be printed in the proceedings.

MR. RUHL: Mr. Chairman, it is so late at this time, that I think it would be wise not to trespass on the time of the members any further, and the proceedings of the Congress will be published, and at that time, if the members are interested, they may read it in the report. It is after 1 o'clock, and I know the directors of this Congress have a scheduled meeting at 1 o'clock, and there are a number of other things to be taken up this afternoon at the exposition, which will necessitate my getting back, so I think I shall simply refer my paper to the proceedings.

PRESIDENT SCHOLZ: Mr. Secretary, I will call on you for the minutes of the meeting last night, including the election of directors.

SECRETARY CALLBREATH: We had last evening the most interesting session of any members' meeting that I have attended for ten years. We elected as directors for three years: Dr. James E. Talmage, of Utah; Mr. Charles M. Moderwell, of Illinois; Mr. Harry L. Day, of Idaho; Dr. William B. Phillips, of Colorado.

The place for holding the next convention of the American Mining Congress was discussed, and whether a mining show shall be held in connection with it. The Board of Directors was requested to make Chicago the place of holding the convention and the proposed mining show. It was decided to hold a mining show in connection with the convention at Chicago next year. This is planned to be a great educational exhibit, through which we may carry to the people at large a better understanding of the economic conditions underlying the mining industry.

A word regarding the banquet this evening at the Palace Hotel in honor of Mr. Van Manning, the new Director of the Bureau of Mines: There is a big time promised, and some excellent speakers, and we want you all there. Then we want you to report at the Palace Hotel, or indicate by phone, whom you would like to sit with, at the banquet table. Mr. Wilson is in charge of the seating of guests, and if you do not advise him, you may not be seated as you desire. Mr. Wilson will see that your suggestions are complied with as far as possible.

MR. WILSON: Mr. Chairman, one other announcement I should like to make, in the absence of anyone from the Bureau of Mines to make it: A project which was very dear to the heart of Dr. Holmes, and was one he was most anxious should be gone ahead with, and it is one I am sure will be carried out by his successors, is the holding of a great second National Mine Safety Demonstration similar to the one held in Pittsburgh in 1911. It is proposed that this shall be held in Pittsburgh in September or October of next year, 1916, on the occasion of the dedication of the great group of new buildings which are being erected there to house the Bureau of Mines. I have no doubt you will receive invitations to attend such a demonstration in due time. If

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you have not fixed your dates definitely in Chicago, it might be well for you to consider the matter that I have just suggested.

SECRETARY CALLBREATH: Mr. Wilson, will you also repeat the invitation to our members to attend the safety exercises here tomorrow?

MR. WILSON: Tomorrow at 9 in the morning, and again at 2 in the afternoon, will be held the annual interstate mine rescue and first aid contests, on the north park just facing the Golden Gate, to the north of the Mines and Metallurgy Building. There will be about twenty-three first aid teams, representing about twelve different States in the Union, and eleven mine rescue teams, representing, I think, nine States, which will compete for the privilege of entering the contests of the second day—day after tomorrow—for the national prizes, cups and medals which the National Safety Council, the California Metal Producers' Association and other institutions have offered. So the day after tomorrow, at the same hours, 9 and 2, will be the final tests between these different crews for skill in mine safety, rescue and first aid work. Following the contests there will be a demonstration of the explosion of coal dust in a large gallery similar to a mine tunnel, 125 feet long and 6 feet in diameter.

Finally, Friday evening, at 8 o'clock, in Recital Hall in the Festival Palace, the announcement of the winners of these medals and prizes will be made, and they will be awarded. Everybody is invited to attend.

MR. MACKENZIE: I would like to have the Secretary include a reproduction of the map on the wall in the printed report, if there is no objection.

PRESIDENT SCHOLZ: It has been already discussed, Mr. Mackenzie, and taken care of. Is there any further business to come before the Congress?

MR. WHITE: Can copies of the map be gotten?

PRESIDENT SCHOLZ: They will be included in the proceedings.

MR. WHITE: No, but if we want to take away from here to the various States from which we came?

PRESIDENT SCHOLZ: I think Mr. Eldridge, who provided that map, is not in the room, but he will be here later, and can answer that question. I think, however, that copies can be obtained, because it is a blueprint, and can be reproduced.

MR. TALMAGE: Mr. President, as the time for adjournment has practically arrived, I move that the American Mining Congress extend to the President and Secretary of this organization our hearty thanks for the skill, consideration, courtesy, and generally excellent manner in which they have conducted the proceedings of this association.

The motion was seconded by a number of delegates.

DR. TALMAGE: It being in order, I undertake to put the motion.

The motion was thereupon duly put to the convention by Dr. Talmage, and was unanimously carried.

PRESIDENT SCHOLZ: Gentlemen, I certainly thank you, and appreciate the kind remarks by Dr. Talmage, as manifested by the unanimous vote for the Secretary, the officers, and last and least, myself.

If there is no further business to come before the house, we will now conclude the business session, to resume at 7 o'clock the pleasurable part of this Congress.

Whereupon the last business session of the eighteenth annual session of the American Mining Congress was adjourned sine die, at 1:15 o'clock.

MEETING OF MEMBERS.

Tuesday, September 21, 1915, 8 P. M.

The annual meeting of the members of the American Mining Congress was called to order by President Scholz in Parlor C, first floor, Palace Hotel, San Francisco, Cal.

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PRESIDENT SCHOLZ: Gentlemen, please be in order. Will the members please come forward in the room? Is there a quorum present?

SECRETARY CALLBREATH: There is a quorum present. Besides those who are present, there are in my hands one hundred and eighty-six represented by proxies and there are four or five others who hold proxies.

How many have you, Mr. Mackenzie?

MR. MACKENZIE: I think I have eight or nine.

SECRETARY CALLBREATH: Has anybody else any proxies?

MR. MACKENZIE: Do you need them?

SECRETARY CALLBREATH: No, I just want to know if you have them.

PRESIDENT SCHOLZ: We will now read the minutes of the last meeting.

The Secretary read the minutes of a meeting of the Executive Committee held at Kansas City, January 28, 1915.

PRESIDENT SCHOLZ: Gentlemen, you have heard the minutes of the last meeting. What is your pleasure?

MR. WELLS: I move they be approved as read.

The motion was seconded by Judge Richards.

The motion was thereupon duly put and carried.

PRESIDENT SCHOLZ: It is so ordered. The next thing on the order of business is the report by the Secretary.

Secretary Callbreath presented his annual financial report, as follows:

AMERICAN MINING CONGRESS.

Secretary's Financial Report, December 1, 1914-August 30, 1915.

Cash on hand December 1, 1914		$ 3,087.79
RECEIPTS.		
Membership fees	$ 418.00	
Membership dues	2,422.55	
Advertising	3,646.40	
Special contributions	6,777.37	
Associate memberships	1,295.00	
Miscellaneous (including interest on deposits, etc.)	856.78	
Total receipts		15,416.10
Total to be accounted for		$18,503.89
EXPENDITURES.		
Secretary's salary, August, 1912-April, 1913	$4,000.00	
Secretary's traveling expense	1,389.92	
Assistant Secretary's salary and traveling expense	1,690.86	
Printing and engraving	3,168.53	
Advertising men, Mining Congress Journal	2,996.56	
Stenographic and office help	1,324.95	
Editing Mining Congress Journal	984.82	
Rent (Washington and Denver offices)	645.00	
Telephone and telegraph	119.32	
Auditing accounts, reporting convention, and freight on furniture	339.50	
Office equipment	232.75	
Postage	401.45	
Richard L. Humphrey (balance due as Director of First Mining Show, Philadelphia, 1913)	546.41	
Office supplies	127.75	
Miscellaneous, including Douglas luncheon, etc	146.32	
Total expenditures		$18,114.14
Cash on hand August 31, 1915		$389.75

Expense covered by vouchers 60-297 Metropolitan Bank.

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Expense covered by vouchers 1-111 Munsey Bank.
Expense covered by vouchers 1354-1367 Denver Bank.

In Metropolitan Bank	$304.32
In Munsey Bank	78.53
In Denver Bank	6.90
	$389.75

Respectfully submitted,
J. F. CALLBREATH, Secretary.

HOWARD C. BECK & COMPANY.
CERTIFIED PUBLIC ACCOUNTANTS.
Riggs Building, Washington, D. C.

September 10, 1915.

We hereby certify that we have examined the books and accounts of the American Mining Congress, J. F. Callbreath, Secretary, covering the period from December 1, 1914, to August 31, 1915, and find that the total transactions were as follows, all disbursements being evidenced by proper vouchers and canceled checks:

Cash on hand December 1, 1914		$ 3,087.79
Receipts		15,416.10
Total to be accounted for		$18.503.89
Disbursements		18,114.14
Cash on hand August 31, 1915		$389.75
National Metro. Bank, Washington, D. C.	$304.32	
Munsey Trust Company, Washington, D. C.	78.53	
First National Bank, Denver, Colo.	6.90	
	$389.75	

As per bank pass book and statements, less outstanding checks.

We also find that the books have been well and accurately kept. The balance due the Secretary for his salary account to September 1, 1915, is $13,700.00.

Respectfully submitted,
HOWARD C. BECK & CO.,
By Howard C. Beck, Certified Public Accountant.

PRESIDENT SCHOLZ: Gentlemen, you have heard the report of the Secretary.

MR. BULKELEY WELLS: Mr. President, I move you the financial report of the Secretary, as read, be accepted and approved.

JUDGE RICHARDS: I second the motion.

The motion was thereupon duly put.

SECRETARY CALLBREATH: Mr. Chairman, I would be gratified, and I think, no matter how much confidence you have in me, that these accounts should be gone over by some one in your behalf. I might say I made this request last year in Phoenix, and a committee was appointed, but some member moved that the report be approved anyway, and that resolution was passed. Later the committee made a report approving the account. If that is not done, and I hope it will be, I would like you gentlemen to know exactly how these accounts are kept. All the money is paid out by checks. The vouchers are numbered consecutively and each paid with a check of the same number. The paid check is filed with the voucher. At the end of each month a financial statement is sent to the President, showing the receipts of the prior month, and a statement of the disbursements, together with a duplicate of the vouchers upon which the checks are paid, so that the President is at all times kept in touch with the business affairs of the Congress. I have here all the original vouchers, the original monthly statements, and the bank statements showing the balances, so that it will be easy for a committee to examine the report.

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Judge Richards then called for the question.

PRESIDENT SCHOLZ: You have heard the motion. What is your pleasure?

The motion was thereupon duly put and carried.

PRESIDENT SCHOLZ: I will say that these reports come to my hands very regularly every month, and are gone over, and if there is any "divvy up" going on, I am in on it, so I don't know that I care to have them examined. If you will, therefore, accept the Secretary's word, that let's me out! (Laughter.) I might add there is one account not included because not received. There are several for that matter. One is from the Indiana operators which has not yet been received.

SECRETARY CALLBREATH: It has since been paid.

PRESIDENT SCHOLZ: But not included in this account?

SECRETARY CALLBREATH: This covers the accounts up to the first of September, and those other receipts accounts from the Cripple Mine Operators' Association and the Indiana coal operators are included in the present month's receipts but not included in this statement.

PRESIDENT SCHOLZ: There is one further contribution to be made by the State of Nevada, which Mr. Friedman, who was in my office a week ago today, told me would reach us within thirty days, or before, if he could get home before that, so I hope we will start out the New Year with a substantial surplus in our treasury.

SECRETARY CALLBREATH: May I say, gentlemen, while we are here, the Mining Congress Journal has been a source of great burden to us this year. It was proposed to establish it starting the first of January, and when I got back from the Phoenix meeting late in December, to get out a journal of any pretense in the month of January was a very difficult task. Our first assistant editor was not satisfactory, but the second guess, I believe, has brought out the best man in the United States for the particular work we want him to do; that is, to get the news from the departments and bureaus at Washington, which have to do with mining, and get it to you at the time you want it. The present month's Journal carries a report on the oil investigation which will probably not be printed for several months. Some newspapers will be grieved that they did not find this first, but they did not, and this is the only publication of this report. We want the Journal to carry this news to you, and as promptly as possible, and I think that no better man can be found than Mr. Paul Wooten, the gentleman now on the job, and I hope that you will all be satisfied with and fully support the Journal. Had it not been for the deficit in publishing the Journal the year's financial showing would have been very satisfactory.

PRESIDENT SCHOLZ: The next in order of business is the election of a Nominating Committee, to nominate five directors, one to serve for a period of one year to fill vacancy, and four to serve for a term of three years, to succeed D. W. Brunton, George H. Dern, Falcon Joslin and Harry L. Day, whose terms of office expire. Mr. Secretary, how is that handled?

SECRETARY CALLBREATH: The committee is to be selected by the members present.

PRESIDENT SCHOLZ: What is the number of the Nominating Committee?

SECRETARY CALLBREATH: The Nominating Committee usually consists of three.

MR. TALMAGE: Mr. President, I move that if in accordance with the By-Laws, the Chairman appoint the Nominating Committee.

SECRETARY CALLBREATH: It would not be, Dr. Talmage. The practice is to take it entirely away from the present offcial board to the hands of the members present to make the selection.

PRESIDENT SCHOLZ: We might fix the slate if it was left to the President's hands, and that we want to avoid! (Laughter.)

JUDGE RICHARDS: Great inducement, I am afraid!

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MR. TALMAGE: Mr. President, I nominate, as one of the Committee on Nominations, Mr. A. G. Mackenzie, of Utah.

PRESIDENT SCHOLZ: Mr. Mackenzie has been nominated. Two other nominations, if you please.

MR. RUHL: Mr. Chairman, I would nominate Judge Richards, of Idaho.

PRESIDENT SCHOLZ: One more nomination, gentlemen, is to be made.

JUDGE RICHARDS: I nominate Mr. Bulkeley Wells, of Colorado.

PRESIDENT SCHOLZ (after a pause): Are there any further nominations? If not nominations will close. Those in favor of the election of the nominees will say aye. Carried. The committee will retire, and within five minutes bring in a report.

JUDGE RICHARDS: Or less time!

PRESIDENT SCHOLZ: Or sooner, if they can!

MR. WELLS: Will you hand us a slate? (Laughter.)

The Nominating Committee thereupon met to consider nominations for officers of the American Mining Congress, and the members' meeting took a recess until the committee should be ready for their report.

PRESIDENT SCHOLZ: The Nominating Committee has returned to their seats, and I presume has a report to offer. Can we hear from the Chairman?

MR. MACKENZIE, Chairman of the Nominating Committee: Mr. President, the Nominating Committee respectfully submits the names of the following as directors for the next three years:

Dr. J. E. Talmage, of Utah.
Mr. Chas. M. Moderwell, of Illinois.
Mr. Harry L. Day, of Idaho.
Dr. W. B. Phillips of Colorado.

PRESIDENT SCHOLZ: Gentlemen, you have heard the nominations. What is your pleasure?

MR. MACKENZIE: I now move the adoption of the resolution.

SECRETARY CALLBREATH: Mr. President, pardon me, the election must take place by ballot, so that if there are no other nominations before the house—if anyone desires to make nominations, the privilege is certainly open—but if there are no other nominations, a motion that the Secretary be instructed to cast the ballot for the candidates named will be in order.

PRESIDENT SCHOLZ: Do we hear any further nominations?

MR. WOLCOTT: Mr. Chairman, there being no other nominations, I move you that the Secretary be instructed to cast the ballot for the nominations as approved by the Nominating Committee.

The motion was seconded by Mr. Wells.

The motion was thereupon put and carried.

PRESIDENT SCHOLZ: The Secretary is so instructed.

SECRETARY CALLBREATH: Mr. President, by instruction of the motion, I hereby cast the unanimous vote of the delegates present, and those who are represented by proxy for Dr. James E. Talmage, Charles M. Moderwell, Harry L. Day, Dr. William B. Phillips, as Directors of the American Mining Congress for three years, and until their successors are duly elected and qualified.

PRESIDENT SCHOLZ: What further business is there to come before this meeting?

SECRETARY CALLBREATH: Mr. President, I think it would be a good time now to take up the question of our next year's meeting. The power to decide this question is left by our By-Laws to the Board of Directors. I think, however, that it would be wise for those present to discuss this general proposition. There has been a plan under consideration for a little time back to give a mining show in Chicago next year, to hold a Convention in connection with the mining show, and to

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endeavor to get together the largest body of mining men that ever assembled in the United States. It is believed that Chicago is the proper city for such a gathering, from the standpoint of a convention only, and that it is one of the two cities in the United States where a mining show could be made a success. It would be well, perhaps, to review somewhat the history of the Philadelphia mining show. The result of that mining show was a small loss represented by the five hundred and forty-six dollars, which, from the Secretary's report tonight, shows has been paid to the director of that show. It was a splendid show. Two gentlemen, who have examined the exhibits here at the Panama-Pacific International Exposition and who attended the mining show in Philadelphia, have said to me that if the government exhibits were left out of this exposition that our mining show at Philadelphia was a better show than that here. That I presume is upon the theory that the larger part of the exhibit here is the government exhibit, so that does not detract from the credit of this Panama-Pacific International Exposition, but it does show that the exhibits at Philadelphia were attractive and covered a wide field. I want with your permission to state somewhat the conditions. When we undertook to discuss the Philadelphia mining show, I made a request of several of the gentlemen, whom I thought could afford to assist, and asked them to contribute to meet the preliminary expenses which had to be paid in advance, the advances to be returned with ten per cent added. The responses made aggregated the sum of five hundred dollars. At the time I thought we could not undertake it, but as the time grew closer, and the necessity for some way for making some money besides dues of members was so great, I thought we would tackle it anyway, and with that five hundred dollars we financed the show in Philadelphia. We had practically three months until the show was pulled off, but under those adverse conditions we came within a little of making a financial success. I feel that we can give a mining show, and if all the members will take hold and help, we can make it a source of continued revenue to support the work, so that less demand will be made upon the mining fraternity for support. The question is whether Chicago is ready to do its part towards taking the show there, and that being settled, whether you believe we ought to do it, and if that's done, the question is as to how the enterprise is to be financed.

PRESIDENT SCHOLZ: Gentlemen, if you will pardon me for a few moments, I would like to say that I have given it some thought, and the only criticism I have ever made of the Mining Congress work is that they were never ready. We come in at the eleventh hour, and it is surprising that these meetings have been conducted so well as they have. As Mr. Callbreath refers to the mining show at Philadelphia, the gentleman who undertook the work called at my office some time in August, I think, and asked me to help him get exhibitors. I was so absolutely astounded that I could not believe he meant this year, but that he referred to the year ahead. Some of the machinery had to be shipped by express, which was very unsatisfactory to the exhibitors, because usually they like to give the best products they have, and give a few extra finishing touches, all of which was entirely impossible. I feel that the greatest work the Congress is doing is of an educational character, and to me nothing has been more instructive than attending expositions and shows. This is my seventh and I expect to learn a great deal from it, and attend many more to come. Consequently, I believe an exposition can be made a success, provided it is started in time; and the criticism I have made to the Secretary is the fact that under the previous arrangements the decision for the place of meeting had been put off too long, and not sufficient time allotted to the arrangements, and it was therefore that I suggested last night that the matter be taken up at this meeting. I believe this year propositions were received from a firm in New York to finance a mining show without any responsibility to the Mining Congress. I did not think that that was the proper thing to do, because it has too much of the financial phases injected into it. I be-

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lieve that we have the machinery to provide a mining show which should be better than anything that ever has been held. I do not think that there would be the least difficulty in raising the money if we should go to Chicago. At one of the meetings of the Illinois coal operators about sixty days ago I brought the matter up, and Mr. Moderwell, who has been very active in the Mining Congress work, who is the President of the Illinois Coal Operators, expressed himself in about the following words. He said: "I am in sympathy with anything that the Mining Congress wants to do, provided that the manufacturers and exhibitors on whom we will call for financial support do not feel that we are exacting tribute from them. Taking that cue, I called with Mr. Callbreath, I believe, on Mr. Charlie Dearing, also a coal man, and at this time serving as President of the Chicago Association of Commerce, one of the biggest institutions of the country, and had his manager of finance send the business men and exhibitors—at least a limited number—an inquiry as to their feelings with regard to this matter. I also talked to several of the leading newspapers in Chicago, and asked them what they thought about it, setting forth the fact that we did not wish to bleed people who had been very generous in the past, that if they do not think this exhibition would do, to come out and say so. I felt they would express themselves more freely to the Association of Commerce. It is very gratifying to me to say that with the exception of one letter, every letter received spoke in the highest terms of the Mining Congress, and encouraged the holding of a mining show, particularly after we explained that we did not want to exhibit machinery and appliances only, but we wanted to illustrate to the people, to our visitors, certain phases of the industry that the laymen were not familiar with at this time, such as, for instance, items of cost. We wanted to demonstrate clearly to the mind of the least informed by graphic tables and illustrations and information that they did not now possess, and could not grasp from figures. I myself am very slow at figures, and nothing is more helpful to me in grasping a business problem than a graphic illustration. I saw in Dr. Holmes' office a few years ago a number of illustrations which he had used for a congressional committee, and which had helped him to do, in a very few moments, what had theretofore taken hours and days of explanation. That line of talk appealed very strongly to the coal operators, because they have been trying, as you perhaps know, to get before the Federal Trades Commission, and have them investigate the coal mining industry, and they felt that the Mining Congress could help by getting back of such a move. And I am sure the same situation would apply to the metal industry and to other industries, and while I am from Chicago, I am not pulling for the Chicago Convention excepting in so far as I believe it would be a desirable place for the Mining Congress to reach a number of people far in excess of the number they could reach at any other place that I can now think of. You will pardon me for making this lengthy statement, but I wanted to tell you that the matter has been thought of, and is now a live issue in Chicago. However, the decision will be left with you gentlemen, and is merely suggestive on my part.

JUDGE RICHARDS: Mr. Chairman, I am very much pleased with the suggestion that has been given with regard to the Chicago meeting. It strikes me it is a very good thing to do, and will reach the public in that way better than any other place I can think of. It is central, and I am very willing to go there. I would be pleased to have the Board select Chicago as the place of meeting.

PRESIDENT SCHOLZ: I would be glad to hear from other gentlemen present, because it is a subject that is of a good deal of importance, that should not be decided upon hastily. It is deserving of serious thought, but once started should be put through with vim and vigor, so we will have something creditable.

JUDGE RICHARDS: If we are ready for it, I move you that it

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is the sense of the members present that the Board of Directors present select Chicago as the next place of meeting.

SECRETARY CALLBREATH: And also combine with that the exposition suggested?

JUDGE RICHARDS: Combine the exposition suggested.

PRESIDENT SCHOLZ: Before the motion is put to a vote, I would like to have more discussion. Dr. Phillips, you have attended a number of our conventions. You know what we aim to do. Let us hear from you.

MR. PHILLIPS: Not only have I attended a number of conventions of the American Mining Congress, but I have been going to expositions since 1876, and I have often thought that if there could be a mining show conducted in this country under the care of the American Mining Congress, it would be the best show that was ever held in the United States for mining men. A great exposition like this is no place to see mining machinery, and talk to mining men. There are too many distractions; the pace is too swift. We want to concentrate our efforts on a show in Chicago for mining men, and I heartily approve of the idea.

MR. E. L. WOLCOTT: Mr. Chairman, it was my pleasure and work to be all through the show held at Philadelphia two years ago, and I was very much amused when the President spoke about doing everything at the last minute. We did there, everything at the last minute. We were compelled to from many causes, but principally because we started at the last minute to get up that show. Now, I believe with the gentlemen that if the American Mining Congress takes hold of the idea of a show in Chicago at this time, starts it at this time, and lays it out on plans so that everybody who has anything to do with it knows exactly what to do, it will be one of the great big successes of this country, and attract attention that no other show ever has done, of that nature at least.

Now I only heard one phase of it mentioned, and that was mining machinery. I do not think that's broad enough. I think it should cover our mineral deposits; I think it should cover our mining camp resources. There are hundreds of mining camps in this country that need just such an opportunity to bring their resources and deposits before the public. The American Mining Congress cannot do that individually, that is, it cannot boost any camp, and yet those camps ought to be boosted. And today the people who are investing in mining, and who favor the mining industry, should know just what is in the camp.

It has been my privilege to travel over this country in my capacity as assistant secretary a great deal, and I have visited a great many camps in different parts of the country, and have seen some things that are surprising; resources that should have been developed, but were lying idle, because they had no way of bringing them before the public. I believe that every camp that has resources should have a mineral display at the exposition, and have somebody there to explain just what they have, and I believe if that is brought before the mining camps in time, and properly, it will add very largely to the show, and also to the income from the exposition.

PRESIDENT SCHOLZ: There is one interesting feature that was brought out by three or four of the gentlemen I interviewed personally. I have in mind more particularly Mr. Goodman, of the Goodman Manufacturing Company. He said that the best exhibits we have, and that could possibly be put up, were our factories located in Chicago, and if the Mining Congress can be induced to come here, we will buy all the space that you want us to take; but we would like to have the privilege of taking the visitors down to our factories, and let them see how the stuff is made, how we put our machinery together, and what we give them for their money, and from my own observation, that is one method that appeals to mining men very strongly. They like to know how their generators are built, how the motors are put together, what sort of

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castings go into the machinery, and how everything is assembled. And it struck me as a very forceful idea, and one which could not be carried out any place else as well as it could be in Chicago, because there is a greater number of mining machinery plants at Chicago, and in the near vicinity, within three or four hours' ride, that visitors there could learn more in a shorter space of time, than by going to any other place in the United States, as far as I know.

Is there any further discussion? If not, we will take a vote. (Puts motion.)

A DELEGATE: Is any time to be set, or is that to be left to subsequent action?

PRESIDENT SCHOLZ: I would say that it would not be well to fix the time tonight. If you do go, it would be my personal opinion that we would consult with the Convention Bureau of the Association of Commerce, so as to avoid any misfits, and perhaps have it follow conventions that would be called about the same time.

SECRETARY CALLBREATH: Then too, it would not be safe to decide the date until you know whether you can get the hall at that time. That's the prime necessity for the show.

PRESIDENT SCHOLZ: There are two halls in Chicago available for a show of that kind—the Coliseum, which I think is the largest, or certainly the largest building of its kind in the United States, and the First Regiment Armory, on Michigan avenue. Both have splendid locations, right down town, and are filled with conventions of that kind practically every night—automobile shows, business shows, and many others. The railway appliances shows are held in either one or both of those buildings, not to mention the Ringling Circus. Gentlemen, you have heard the motion that the next session of the Mining Congress, coupled with the mining show, be held in the City of Chicago, if the directors approve?

MR. WOLCOTT: Mr. Chairman, I would like very much to hear more individual opinion on this before we put it to a vote. There have been only two or three of us who have expressed their opinion. I think it would be a good idea to call on members.

PRESIDENT SCHOLZ: I stand corrected, and we will go down the line and call on every man present. Mr. Ruhl, you are next in line. You live in Missouri.

MR. RUHL: Mr. Chairman, I am heartily in favor of any such proposition because of the experience I have had this year with the exhibits of the mining industry of our state at the Panama-Pacific International Exposition. It was my idea, in getting up our exhibit, to show our mining from the raw product to the finished product, giving the visitor a general knowledge of costs. I found, when in Washington a few years ago trying to obtain a duty on zinc ores that few knew anything about costs. You talked to a man, supposed to be a statesman, and he knew nothing about this industry of our country. We had great difficulty to get him to understand the trend of our industry; why it was there had been such changes in it; where these factors entered; why it took time, energy, and money to produce zinc for our country's consumers. We are against that same proposition again, and we will have to go up to Washington every three or four years and maybe within the next two years. Therefore every bit of public opinion we can educate in the meantime is going to be good for the zinc and lead industries; good, both for Missouri and Idaho, and both states could do no better thing than to make the cost end of the lead and zinc industries a very prominent feature of the show in Chicago. It is wise to do this, because it is in the manufacturing parts of this country that the mining industry is known least, and where the people want raw products. It is this class of our people who do not want to see any protection on raw products, and that's where we are going to have to do our fighting, our educating, and for that reason I am thoroughly in favor of such a show.

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PRESIDENT SCHOLZ: Judge Richards, you have already expressed yourself. Mr. Allen, you live in the vicinity—in a suburb of Chicago, so to speak.

MR. ALLEN: Mr. President, of course we would like to see the convention somewhere NEAR Chicago, if not IN Chicago. It's a central point. Everybody comes to Chicago. The attendance at a convention there would probably be greater than it would be elsewhere. It might also help to arouse a little more interest among the people in the Lake Superior country in this organization. That is a thing that has occupied some of my thoughts during the past year—why it is that the mining interests of the Lake Superior region are not more active in this organization.

Speaking of the subject of mining costs, it has occurred to me that from some points of view, it would be wise to bear down hard on that subject. But I am wondering if the mining interests themselves would care to make an exhibition of mining costs. We could no doubt, from our office, put up a very good exhibition of mining costs. I doubt very much, however, whether the mining companies would care to make their costs a matter of public information. Such an exhibit would, of course, have a great educational value. The attitude of the mining companies should be carefully ascertained before we go ahead on plans to make a public exhibition of mining costs. I doubt very much if such an exhibition would be looked upon with favor by the mining interests of the Lake Superior region. The reasons for that I need not go into, but it's a thing that should be considered in planning to make mining costs a feature of the exhibition. The mining companies themselves have got to take hold of that if success is attained, because after all, there isn't anybody who knows what mining costs are except the operators.

SECRETARY CALLBREATH: Mr. Allen, your theory is that the mining men of the Lake Superior district would not care to enter the exhibition for the purpose of showing their mining costs. I think you are right, but would they not be interested in an exhibition of mining machinery?

MR. ALLEN: They would.

SECRETARY CALLBREATH: So they could study all the methods?

MR. ALLEN: They also would be interested in seeing the costs that the other fellow had. (Laughter.) I believe that if the Congress were held at Chicago the Lake Superior men would take hold of this matter if proper efforts were extended toward enlisting their interest. According to my information their activity in the Mining Congress is just about nil. Last year at Phoenix I was the only representative from Michigan. There was another representative from Minnesota—two of us from the whole Lake Superior country; and this year there is only one other besides myself. To me that is a queer condition of affairs. We have the largest single mining district on this continent; yet it takes no part in the affairs of the American Mining Congress. Perhaps the Secretary can tell us why it is. I have not been able to discover the reason for it.

SECRETARY CALLBREATH: I think I can give a reason, Mr. Chairman. In the first place, they have an association called the Lake Superior Mining Institute, which works largely along the lines of the American Institute of Mining Engineers. In that organization they have a perfect exponent of their technical and scientific work. In the field of mining politics they have had little interest. I think this interest in the future will be greater than in the past and I feel satisfied that the Mining Congress in its development has reached a point where they will be interested in our work. In the past they have regarded the American Mining Congress as a precious metal organization entirely. I think in the future we will get better support from that section, particularly through the good offices of our friend, Mr. Allen.

MR. A. T. McINTYRE (Elizabethtown, N. M.): Mr. Chairman

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and gentlemen: Just a word from a prospector. I am not a public speaker. I am a delegate from New Mexico, and I have been mining and prospecting for fifty years. I find more interest in the East in mining, fifteen to one, than there is in the West, and I think Chicago would be a logical place for a mining congress. An exhibition in Chicago properly managed would be a great big boon to mining and the Mining Congress.

PRESIDENT SCHOLZ: Mr. Willis, we shall be glad to hear from you.

MR. WILLIS: I am very heartily in favor of a mining show, and believe that there is no better place in the country to have it than Chicago. Such a show should be educational in nature, and primarily for the education of the public. It is from the public that we expect the greater portion of our support, but at the same time, it is necessary to get support from the other side, i. e., the machine companies, and their work will not be so largely educational. The difficulty will be in financing the strictly educational portion. We should do something in the way of educating the public as to costs, their distribution and effects. The public should be shown something relative to the necessity for the redemption of capital, for it seems a very difficult thing to convince even our state legislators that there is any capital to redeem.

Another educational feature that should be taken up, which is one of the chief aims of the American Mining Congress, is the risks and rewards of the mining industry. The public should be shown that one takes no more of a chance under the right circumstances in investing in mines than in any other business. At the same time, the shows must be sufficiently attractive to bring the public there to be educated.

PRESIDENT SCHOLZ: Dr. Talmage?

DR. TALMAGE: I think it was four years ago when the American Mining Congress held its meeting in Chicago, and that meeting appealed to me as one that did much to unite the interests of the coal mining people and the metal mining people. If it be so that the mining men of the great Lake Superior region have not manifested much activity along the line of mining work, I think they should be enlisted. If they won't come to us we should go to them. I am in favor of the proposition for the reasons stated, and that means that I am in favor of the exposition proposed, the details of which, however, must be very carefully worked out. The suggestions offered tonight are most valuable, and others of the kind should be elicited from the members, so that the exposition may be well thought out before we begin the actual work.

PRESIDENT SCHOLZ: Mr. Kimball, we would be glad to hear from you.

HON. ALBERT KIMBALL (Thatcher, Arizona): I am now to some extent associated with this work, having been honored by the Arizona Chapter of the American Mining Congress to be one of its directors.

I am not a miner, though I too dig holes in the earth. My line of operation, however, is agriculture. While the products of effort are vastly different in character, our interests are identical.

Farming is most profitable when close to a good market, and it is evident also that mining is more profitable when carried on in close proximity to agriculture. They go well hand in hand.

On being notified of my appointment as a director, I wrote the acting Secretary, Mr. Wolcott, that this time they had made a mistake, as I was not a miner, but an agriculturist, and therefore I had no place with the Arizona Chapter as a director or even a member. I, however, called on Mr. Wolcott when in Phoenix during the sitting of the legislature and, after talking with the Secretary for a little while, I was convinced that other interests within the state were eligible. I took out a membership.

Along the line of co-operation of mutual effort for the higher de-

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velopment of the resources of our Baby State, let me mention a circumstance of my earlier days in Arizona.

During the first season after my arrival in the Gila Valley, Graham County, Mr. James Calquhoun, general manager of the Arizona Copper Company, of Clifton, Metcalf and Morenci districts, called on me in the valley, I was just moving my family in a rented house. Here many paid their respects to agriculture. Later I returned the visit and was entertained courteously by this Scotch gentleman. I was shown all the works, and walked many miles through the mines. During the course of our conversation, Mr. Calquhoun said: "Mr. Kimball, so long as you dig out of the earth products to live upon, we will be digging the metal out of the earth with which to buy them. Our interests are identical."

Then again, before the days of railroads and other conveniences, only high grade ores could be worked at a profit; the mines were honeycombed for rich deposits, but since the advent of the farmer in near proximity, cheaper food for man and beast, whole mountains are taken down, low-grade ores can be worked.

Another reason for taking the next Congress east: It was not long ago the Eastern Senators and Representatives in Washington looked upon the country out West as a howling wilderness good only to be inhabited by savages, trappers and wild beasts unworthy the attention of great statesmen. Appropriations went easy to Eastern land and waterways, nothing for the West.

When Senator Newlands of Nevada began work on his Reclamation measure he had up-hill work. Eastern Congressmen could not see it. They could not understand how such a law could benefit them. Through the influence of the Trans-Mississippi Commercial Congress, the Irrigation Congress and other organizations, the West gained prominence. But it was not until we showed the manufacturers and dealers of the East that they were the ones to be most benefited would they act.

Through the reclamation of the untold millions of acres of land in the West, the congested centers have been unloaded of their population, the problem of the landless man upon the manless land is being solved, a greater United States established, the East and the West brought together on one common plane of mutual interest.

Therefore, Mr. President, speaking, as I may be permitted to do for Arizona, that the East may better understand the West, and that we may get closer together, I favor Chicago as the next meeting place for the American Mining Congress.

I am sure the mining men of Arizona are misunderstood. They are expending enormous sums in opening up and developing the mines, millions annually go into construction work, improved methods, better machinery, the outlay of much money for greater efficiency.

Generally speaking, our mining men are generous, broad-minded gentlemen, good citizens and, as suggested before, are large enough to comprehend the necessity of agriculture and other interests of the state being developed along with mining.

PRESIDENT SCHOLZ: Mr. Hull, you are one of the old timers. We would be glad to hear from you.

MR. HULL: Mr. President, I think Chicago is one of the best places that we could have this show, and a place where we could gather this congress to advantage, because we will come in touch with men who would take more of an interest in this organization than the men have in the West. The men in the West who are interested in the mining industry have taken the least interest to advance the interests of the mines. When we look through this western country, and at those who have built up this city, with all its set-backs, I believe that they should do more than they have done, but we must remember, there have been so many organizations here, it has almost been impossible for us to introduce ourselves and get them with us.

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PRESIDENT SCHOLZ: Mr. Montgomery, I think you are next in line.

MR. MONTGOMERY: Mr. President, I gave my approval to the choice of Mr. Richards, and seconded his motion that our next convention be held in Chicago, because I believe Chicago more desirable than any other place that could be selected. Dr. Talmage has expressed a very significant sentiment in regard to the uniting of the interests of the coal operator and the metal mine operator in joint support of the Mining Congress. I do not know whether there is an oil operator present to speak for them, but they should be specially considered. Some of the oil operators of the big producing companies of California have expressed in my presence the opinion that the American Mining Congress is an organization which is working particularly for metal miners and not for oil miners or for the oil operators interested in mineral oil lands; and I believe there perhaps has not been enough said, if anything has been said, to indicate that the American Mining Congress is as much concerned in mineral oil lands as it is concerned in the resources of mineral lands not including oil minerals.

A convention held in Chicago would be central between East and West as regards the convenience of men engaged in mining. I assume that proper and full consideration will be given to the oil operator—as much so in Chicago as in Los Angeles or any other city in the United States. I realize that oil is at this time a very important factor in mining, and is used extensively now for higher speed ocean steamers, and particularly so in preparation for war. I surely approve of Chicago as a most desirable place for the next Mining Congress Convention.

PRESIDENT SCHOLZ: Last, but not least, we would like to hear from the Secretary of the Utah Chapter, who has added about seven hundred members in about ten days' time. How many of those will you bring to Chicago, provided you are in favor of it?

MR. McINTYRE: Mr. President, I will have about eight hundred of them there! (Laughter.)

PRESIDENT SCHOLZ: About ten?

MR. McINTYRE: About eight hundred! On this proposition the merits of the selection have been discussed pretty thoroughly by men better qualified than I to discuss this, but one thought occurs to me as an operating proposition for the Convention itself. If we had this show I think we should arrange to have each delegate decorated with a badge on his arrival at the Convention, and then instruct those in charge of the exhibit to admit no man not wearing a badge at hours when the Convention is in session. I give you the facts on which I am basing this argument. Since coming here this evening I have been making a list. I have twelve names on this list of Utah members, whom I know to be in San Francisco. I have seen them. We have had as many as four this morning at one meeting. That is our record. This afternoon I desired to see some of them, so I failed to come to the Convention this afternoon myself, and went up to see them on business of interest to the Convention, and found three of them in the Palace of Mines. That building covers, I should say, about ten acres, and this was mining week, and very busy, and I think it is very significant that I should go out there and find three Utah men, and the others were probably there! It shows the attraction a mining show has for mining men, if running at all times. I think we should see that it does not operate to the detriment of the Congress itself. I am offering that simply, as I said, as an operating feature of the Convention.

PRESIDENT SCHOLZ: The man that will have the biggest end of this work to do, and perhaps all of it, is the Secretary of the Congress, and I would like to have him say something more on the subject before we come to a vote.

SECRETARY CALLBREATH: Mr. President, I am in favor of the plan proposed, although I realize that it will entail an enormous amount of work and responsibility. I am not sure there would be any-

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thing left of me by the time it is over. I do believe that the plan proposed presents a number of advantages.

In the first instance, I believe it would help us financially. In the second instance, and more important, I believe that it will give us an opportunity to educate the public as to the methods of mining, the economic principles underlying the mining industry, and bring to us that greater sympathy of the public which is essential. I believe it will bring the men who are interested directly in the mining business into closer sympathy with our efforts, and thereby strengthen our work thereafter. I believe it will bring many men together in such a way as to create a more fraternal feeling between the members of the mining industry and the other industries indirectly interested in the success of mining.

The gentleman from Arizona has outlined the conditions there, where the farmer realizes the advantage to him of having a market close by for his products, and the miner is brought to realize it is an advantage to him to be able to buy his farm products at a close-by point without the addition of an enormous freight rate. This idea was in mind when the American Mining Congress was organized. The preamble to the By-Laws of the American Mining Congress includes these words: "To promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce; and for the particular purpose of bringing the mining men of the United States into closer relation with one another, and of promoting a friendly feeling for one another through social intercourse and the discussion of mutual interests."

As the Mining Congress work has developed we can appreciate the vision of the framers of that preamble, which for many years was as sounding brass. A mining show will give us an opportunity to work out educational problems for the public in a way that cannot be done in any other manner.

I believe if we begin now, that we may have a convention of five thousand delegates, and let us now set that as our goal, and make ourselves a committee to see to it that we will have as many delegates present at our Convention as there are people interested in mining in the United States.

We should demonstrate to both West and East the necessity of developing the latent mineral resources of the West, so that when these big mining operations now in progress have exhausted their resources, there will be other mines ready for the employment of the capital and skill and brains and energy and labor now so employed. It is a vital question to the West, and is equally vital to the East. One of the important questions which has to do with our industrial life is the question of money. Just at this particular time, through a world war, the United States is gathering to itself the gold of the world, but we cannot keep it. The gold of the world is coming into our treasury, but it will have to go back again, because other nations will require a basis for their currency system. Gold will go to that point where it commands the highest premium.

We should demonstrate to the people of the United States the necessity of the development of the mining resources of the West. There are thousands of methods by which we should carry on an educational campaign, and I believe this show, if it has the support of the mining industry, will bring out the best thoughts of those who are interested in this great question of the development of the mining resources of this country, and that is the special mission of the American Mining Congress. I thank you.

PRESIDENT SCHOLZ: Gentlemen, we have heard from every one in the room, but for the purpose of closing our records, I will now call for a vote on the resolution that the directors be requested to select Chicago as the next point of meeting of the Convention, and the mining show.

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The motion was thereupon duly put and carried.

PRESIDENT SCHOLZ: It is so ordered. Is there any other business to come before this Members' Meeting tonight?

SECRETARY CALLBREATH: If any member has anything that he thinks we ought to do, now would be a good time to tell us. Mr. Allen is full of suggestions.

MR. ALLEN: It is nothing of any importance, but the remarks of the Secretary about increasing the confidence of the people in mining investments, brought to my mind the question of the regulation of stock issued by mining companies. In other words, blue sky legislation. A few years ago a blue sky law was passed in Michigan. The Federal courts promptly disposed of it. A committee of the Attorneys General of the various states then drafted a blue sky law that they believed would stand before the Federal courts. Mr. Fellows, the Attorney General of Michigan, was the Chairman of this committee. It was passed by Michigan, and I think some other states last winter. This law has already been attacked in the Federal courts. In our brief experience in Michigan we have found that the mining brokers are hostile to these blue sky laws. Under the present Michigan law a mining company that wants to sell stocks or bonds must obtain permission from a body known as the Michigan Securities Commission. They are required to file a statement and if necessary submit to an examination of their properties, their books and their entire project, by a competent agent of the Commission and to pay the expense of such examinations. I believe that if some such regulation were country-wide it would quickly solve the difficulty of floating reputable mining enterprises. The people look askance at new issues because they have been loaded with so much worthless paper. Of course no one expects a governmental commission to guarantee profits. The investor does, however, want to be protected against crooked promotion of worthless properties. Many people like to gamble in mining stocks and will take a long chance on a fair, straightforward, business proposition. They want a fair run for their money; that's all. I think this Congress has a committee on mining investments. I do not know whether they are making an examination of blue sky legislation, but I think that's a subject that might well engage the attention of this Congress, and the serious attention of the Convention.

MR. McINTYRE: Mr. Chairman and gentlemen: Just a word on that subject. I am not a mine promoter—just a miner, but I have had, not the pleasure, by a long sight—the necessity of going out and selling mining stock to develop a mine. We put our mine thirty-eight hundred feet into a mountain; it has taken us fifteen years to do it, my brother and I, both of us being miners. It has taken us, as I say, fifteen years to do it, and out of the fifteen we worked six. When we got out of money we closed down, and went out and secured new funds to continue the work. I sold the stock in the East—New York, Pittsburgh, Pennsylvania, New York and Ohio—all through the East. I went up into Michigan; they had a blue sky law. I went to a friend of mine there, our attorney, and asked him to give me details. I did not know much about these things, of course. This friend gave me an outline. I had to go to Lansing, the capital, to file my bill; had to pay a hundred and fifty dollars to an attorney, and there were a whole lot of details I cannot call to mind just at present; but our corporation was a little different from any other, I guess, in the United States. It was not started out as a corporation, but was turned into one later. It is capitalized at five hundred thousand dollars. My brother and I took sixty thousand dollars, and every miner is a stockholder. I made a proposition to our stockholders, and they sold stock and got a commission. I did not want a commission, but only wanted money enough to do the work. According to the law of Michigan every stockholder is a part owner. I had to send their auditors down there, and it cost seven dollars a day; we had to pay seven dollars a day from the time they left Lansing until they got back there to audit the books, not only our main office books,

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but the books that I kept, of every one of these stockholders. Now, that was a hardship. I know of my own knowledge of seventy corporations that pulled out of Michigan and went to Canada. In Ohio they started the same kind of a law, based on the Michigan law, and that went to the Supreme court. I do not know whether it was repealed or not.

Now, if they can get a simple law that will provide the investor and the honest miner with the information desired it would be a grand thing.

The blue sky law today, as it exists in Ohio and Michigan, is one grand failure.

MR. WOLCOTT: Mr. Chairman, I would like to ask Mr. Allen what the personnel of your commission is—that is, what businesses were the individuals in previous to their appointment on the commission?

MR. ALLEN: The Michigan Commission consists of the Attorney General, the Commissioner of Banking, and the State Treasurer! (Laughter.)

MR. WOLCOTT: Mr. Chairman, that is the objection of the West to the blue sky laws. They start out by putting a man on the commission who is opposed to mining investment, no matter where it comes from, or how good it is, because he thinks it comes in conflict with the banking interests.

A DELEGATE: Yes, sir.

MR. WOLCOTT (continuing): I heard a banker in one of these Western states, a man who had made a fortune out of mining in Colorado, say that a mine is not security for any kind of a loan. Now that's the kind of a man in most of our states who is selected to say whether it is safe or not to invest in a mining deal. Now, the mining man has no objection to the world at large knowing exactly what he is doing with the money that he raised to develop the mine.

MR. ALLEN: Mr. President, I feel that the Michigan Securities Commission ought to have some defense! (Laughter.)

PRESIDENT SCHOLZ: Do they need it?

MR. ALLEN: Of course, those men are not grafters at all. They have a sympathetic attitude towards mining, albeit one of them is a banker. I am not sure that the words which have been spoken here are the consensus of opinion of mining men the country over, but there seems to be serious misapprehension about what the Michigan blue sky law is, and how it is administered. The Michigan Securities Commission does not undertake to guarantee profits to anybody. It requires, however, that in the capitalization, the organization, and the plan of the applicant there is nothing crooked. Now, to illustrate the necessity—or at least the advisability—of some kind of regulation, I will use a case which recently came to my notice. There is a little oil in Michigan. Two or three years ago oil of high grade was found in the Saginaw Valley. There was an influx of people from Louisiana and other states, some of whom took advantage of the excitement to exploit the people rather than the oil pools. For instance, a certain concern bought forty acres of land from a Polish priest. They divided this forty acres of land up into a large number of small parcels, which were sold outright at ten dollars apiece. (Laughter.) There were enough pieces of this land on forty acres to make a capitalization of about two hundred thousand dollars, if I remember rightly! (Laughter.) Of this two hundred thousand dollars, the priest, we will say, was to get sixty thousand dollars for his forty acres. Of the remaining hundred and forty thousand dollars, the promoters were to get about seventy thousand; the remaining part of the money was to be spent in drilling on this forty acres. We had no blue sky law at that time; it was being considered in the legislatiure, and was passed a month or two later. This concern was put out of business by a mere publication of the facts in the newspapers, but if the blue sky law had been operative at that time it could never have got started. This concern could not live in the light of day.

It is one kind of concern that the Michigan blue sky law will put

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out of business. Every honest mining man will agree that such concerns should not be allowed to exist.

I think the condition to which our friend refers arises from the fact that very few of the states have these laws. If there were some general legislation of this kind, there would be no necessity for charging seven dollars a day and expenses for a man sent from one state to another to audit books. The commission in one state would merely take the certificate of the commission of any other state having similar regulations. If there were some kind of uniform legislation, the expense of administration would be little. In Michigan the State Geologist is often asked to co-operate with the Securities Commission. In the case of local concerns he usually has information that he can furnish to the commission at practically no cost to the operator. He merely O. K.'s the facts in the case to the commission. That is his only function. Why, I think, gentlemen, that the operators ought to look upon reasonable regulation with sympathy, and not with antagonism. It is a means of putting mining securities more nearly on a par with other securities.

Now, we have thought that the Michigan Securities Commission ought to do for the mining industry what the Michigan Railroad Commission has done for some industrial bonds and stocks. The certificate of approval of the Michigan Railroad Commission helps to sell the security. Without it the securities are not so easily salable. Our public utilities corporations look upon the Michigan Railroad Commission as the best friend they have. You could not abolish that commission with their consent. The approval of the Michigan Railroad Commission is a guarantee of the soundness of the paper they have to sell. Perhaps the Michigan Securities Commission may some day attain a somewhat similar standing.

MR. TALMAGE: Mr. Chairman, it's very late. I merely want to suggest for Mr. McIntyre's comfort that the definition of a mine as quoted by Dr. Phillips was quoted in its original form, and in its revised form it is more comforting—that "a mine is a hole in the ground owned by an optimist!" (Laughter.) And I think Mr. McIntyre and his brother have demonstrated the soundness of this definition.

MR. PHILLIPS: Mr. President, I have a new definition of an optimist that I would like to submit to the doctor, namely, that "an optimist is a blind man looking hopefully in a dark room for a black cat that is not there!" (Laughter.)

SECRETARY CALLBREATH: Mr. Chairman, the purpose of our committee on mining investments was to develop some general plan which would accomplish just what the gentlemen who have spoken both for and against the Michigan law desire to have done, namely, that the honest promoter of a fair proposition can have his stock made more salable by virtue of the approval of the commission, and that the man who is attempting to rob the public shall be prevented from so doing. Our Committee on Mining Investments developed what was known as the Pardee law, as the then best method by which we might protect the industry. That law provided that any man who made a misstatement concerning the mine, or any other feature which had to do with the value of the stock was guilty of a misdemeanor. This law was enacted by fourteen states.

Now, we had hoped to be able to secure the passage of that law by other states, and to provide assistance to the prosecuting authorities in the several states. Now, our committee is for the purpose of working out some plan by which the honest promoter can have the benefit of some investigation, so that his stocks will be more salable, and the dishonest promoter can be put out of business.

MR. KIMBALL: Mr. Chairman, we have the Corporation Commission in Arizona that is doing effectual work along this line. It is protecting the investors. It is the privilege of any community or individual to make inquiry of the Corporation Commission concerning any corporation promoter or any individual who comes into the state, and

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to ask how about the corporation. The Corporation Commission stands between the investor and the promoter. I believe I am commencing to appreciate this organization more than I ever did before, especially if there are fair-minded men on the commission, who will act as arbitrators between the various interests, as they are seemingly doing in our state, and I believe they are bringing very good results.

MR. WILLIS: Mr. Chairman, I should like to answer my friend from Arizona. Incidentally, I am from the same state.

The Corporation Commission of Arizona is composed of effective officers, doing their required work well, but the Corporation Commission of Arizona does not investigate. I have knowledge of three companies who were put out of business for illegal transactions, who had the O. K. of the commission. The Corporation Commission makes no pretense of investigation.

Now the name "Arizona" has for many years been closely associated with "wildcat" in many of our Eastern cities. There are some counties in Arizona that, owing to the very rich mines within them, have so thoroughly been "wildcatted" that to mention them in the East almost prohibits the raising of capital. The Arizona State Bureau of Mines has for some time been considering a plan which will relieve this difficulty. It has some objections and has not yet been adopted, but is under consideration at the present time.

Any mining company that is going to promote a mine within the state is allowed the privilege of sending to the State Bureau of Mines and have an engineer sent out from there at their expense, only the actual cost being charged. No report is issued, or no prospectus written, but the companies are then privileged to refer any prospective stockholder to the State Bureau of Mines, which organization will only advise as to the legitimacy of the operations. The plan has one serious objection in that it interferes to some extent with the regular work of the consulting engineer, but still has many advantages in that anyone may feel that they can send to some office and get an unbiased opinion of the legitimacy of any speculation.

The idea that a stock approved by the Arizona State Corporation Commission carries anything with it is not correct; it only carries with it the fact that the promoters themselves could get a few recommendations from a few prominent men in the state, and I know of but few people who could not get such recommendations.

MR. MACKENZIE: May I say just a word? The American Bar Association met at Salt Lake last month. They are endeavoring to obtain a uniform corporation law which is aimed particularly at the wildcats. That movement is commanding the best thoughts of such eminent and public men as Judge Taft, Senator Root, former Senator Bailey, Senator Lewis, of Illinois, and men of that class, and it's very likely that the prestige of those gentlemen and the public influence that they command will accomplish something along the line suggested by Mr. Allen of uniform regulation of these matters. I am just mentioning that by way of information, in case you have not noted the action the American Bar Association took on that matter.

PRESIDENT SCHOLZ: Is there any other matter to come before this meeting?

MR. TALMAGE: I move we adjourn.

PRESIDENT SCHOLZ: Before adjournment is taken I want to announce a meeting of the Board of Directors in Room 2001 in this hotel at 1 p. m. tomorrow. Inasmuch as there are just sufficient directors here to make a quorum, it is absolutely essential that none go to the Fair grounds! (laughter) or other places, but report promptly at 1 p. m. in Room 2001.

It has been duly moved and seconded, I believe, that the Meeting of Members adjourn.

The motion was thereupon duly put and carried.

Whereupon the Meeting of Members was adjourned at 10:35 o'clock p. m.

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The President's Annual Address.

CARL SCHOLZ,

CHICAGO, ILL.

An appreciation of the fitness of things determined the American Mining Congress to hold its meeting in San Francisco this year, and to participate in the Exposition which celebrates the completion of the Panama Canal.

Mining has had much to do with the development of the West and hence with the creation of those conditions which made the Canal, in a home sense, advisable. We may well say that mining is in fact responsible for the discovery of the Pacific Coast, or at best its rediscovery under more favorable conditions. Until gold was found in California, the vastness of the Western prairies, the snow-capped ridges of the Rockies, and the alkali deserts presented a series of barriers to the early settlers which they were not keen to try to surmount. To cross all three with primitive transportation facilities was a problem as difficult and as hazardous as the sailing of the unknown seas by Columbus some 400 years ago. The discovery of gold, however, brought a great number of people to the Pacific slope, and California's cities grew out of those mining camps. This magnificent city is one of the results.

Thus mining is the foster parent of modern California and, indeed, the underlying industry of the West. That is to say, the miners and prospectors soon learned to appreciate California's wonderful climate and soon learned the capabilities of its soil. This led directly to that great agricultural and horticultural development which has become famous the world over.

With the double productivity of the State proved, the railroads indulged in competitive campaigns looking to the construction of transcontinental lines to bring in the equipment to be used in the mines and to carry away the products of the soil. Thus began the trade exchange on which California grew.

These facts are mentioned because as miners we are proud of the strong influence which our industry has exerted upon a community so productive of great wealth that it finally called for and brought about the construction of the Panama Canal.

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We have an interest in the completion of the Panama Canal as an engineering feat, namely, that in the execution of the work mining methods were used, such as dredging, sludging and blasting. And, without the use of cement, which is also a product of mining, it would have been impossible to complete this work without excessive cost and delay.

California is truly a great mining State, ranking as it does the fifth producer of the United States, with an annual value of the production of over $100,000,000. This is more than the output of twenty other states. And the growth from nothing to this commanding position has been accomplished in less than seventy years. It is, therefore, proper that the highest tribute should be paid to the representatives of the mining industry in this State.

We are becoming accustomed to deal in very large figures in this country, but few not connected with the mining industry realize that the value of the mineral products of the United States in 1913 was in excess of $2,500,000,000.

This convention at San Francisco was called mainly for the purpose of bringing together men interested in mining that they may appreciate that their purposes and their problems are one, even though their technicalities and their local conditions differ. To this end we afford opportunity for brief discussions, believing that with the ground cleared here of any and all misgivings the work will be taken up more actively and with more purpose when we return to our respective homes. With this in view, the list of addresses has been confined to the most urgent and important subjects. In keeping, this statement of your president is restricted to a brief review of the accomplishments of the year and to a few suggestions touching future needs.

The year just closing has been one of many and grave perplexities. The European war, which so seriously depressed the metal producing industry during the closing months of 1914, resulted in a healthy reaction to the copper and other metal industries in 1915. At the same time general business has endured a depression which had a detrimental and blighting effect upon the coal industry. This is especially true of the Central Western States. The exports of coal from the Eastern fields, or those adjacent to the seaboard, and the sales of coal to makers of war materials, have in part offset the domestic trade losses.

To relieve their distress, strenuous efforts have been made by the coal operators of Illinois and Indiana to devise and adopt per-

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missible co-operative methods that would introduce economies and eliminate the disastrous and wasteful forms of competition, while leaving the competitive spirit full room in which to grow healthfully.

The increased use of water power, fuel oil and gas, the consolidation of light plants, and the establishment of electrical central power stations, have seriously curtailed the use of coal in various sections. These things, in addition to the unsettled trade conditions and to the influences growing out of the European and Mexican war situations, have brought about a serious situation for many coal fields; they have affected employers and employes alike. The aid of the Federal Trade Commission, which came into existence on April 1, has been invoked in an effort to find a solution for these problems. But the Commission feels that, as now constituted and endowed, it has no power to deal effectively with the situation. Even so, it is deeply in sympathy with the efforts of the coal owners.

This convention will be addressed by the ablest men in the country on the question of governmental regulation of business, hence it is not necessary to elaborate that subject here. Suffice it to say that it is the evident tendency that we are to become a government by commissions; whether this will meet our complex needs is one of the grave questions of the hour. Its very gravity suggests that it should be the duty of every citizen to consider carefully this subject as the one most vital to his welfare and to the very existence of our form of government. Meanwhile, the enactment of the Clayton bill, which in a sense permits labor to do the very thing which the Sherman act denies to capital, suggests a growing political tendency to distinguish between forms of employment, degrees of wealth and the voting strength of the adherents of certain ideas which—seeing the indefinite and uncertain attitude of the courts—strikes at the very foundation of our government. This Congress has been neither an antagonist nor a protagonist of capital. But it does stand firm on the doctrine that our government must show partiality to neither. It insists that the national Congress and the State Legislatures shall consider these economic subjects in terms of enduring principle and not in terms of relative voting strength of certain partisans.

It is not our belief that the report of the Commission on Industrial Relations as recently published was expressive fairly of the facts considered nor of any attitude which our government can take. Its publication as a public document can work only mischief, and in consequence it is deplored.

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Perhaps no social or economic subject has been so generously discussed as the propaganda for workmen's compensation acts. Laws on this subject have been operative in a number of states for several years. This subject has been discussed frequently on this floor, and undoubtedly the statements here made have given helpful direction to many efforts to make these laws sane. Even so, there is great lack of uniformity and there is need that we address ourselves to that subject at once. For example, it is clear now that the compulsory feature, injected into the laws of several states, does not meet the approval of either the employers or the employes. This needs to be changed.

Also, employers generally believe that the industry should bear the cost of its accidents, but in many instances the decisions made by State Commissions are manifestly unreasonable and result in litigation and ill will, which is not desired by the employers and cannot be beneficial to the employes. A better way than now exists generally must be found for collecting and administering any fund collected for this purpose.

The attitude of the government in endeavoring to obtain information which will assist it to find a solution for some of our vexing industrial problems is deserving of our commendation and should have our co-operation. The activities of the Federal Trade Commission are especially commendable in many directions, but in no one way more so than when it advised industries generally to adopt standardized accounting for the ready and accurate comparison of competing units and for the purpose of ascertaining costs.

The co-operation existing between the Bureau of Mines and the Geological Survey and the mining industry should be furthered by asking suitable appropriations for this work. In addition to the safety and life saving features and rescue work, the complete utilization of our mineral resources should be encouraged. The great need for coal tar products and its adoption for the separation of ores by the flotation process and other problems resulting in greater economy are deserving of the closest attention. Co-operation with the Federal Trade Commission in solving the problems of fair and unfair competition and an extension of trade relations is desired.

The question of control of the mineral resources, now withdrawn by the government, is of the utmost importance. The present status is seemingly unsatisfactory to a great number, and it would seem advisable to bring the needs of the affected areas fairly before

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Congress to settle the present chaos with as little delay as possible and with justice and fairness to those directly affected.

Reference to the development of the mining industry and the conservation of life and limb to those engaged therein would not be complete without recalling the untimely death of the first director of the United States Bureau of Mines, who, as a life member of this Congress, was one of its staunchest supporters. A special session will be held on Tuesday, September 21, in commemoration of Dr. Joseph A. Holmes.

Death has also claimed other prominent members during the year. The West, in the death of Colonel Thomas Cruse, has lost a prominent figure in the metal mining industry; the Southwest, Mr. James Elliott, who was our vice-president for Oklahoma and one of the leading figures in that section.

It is gratifying to say that notwithstanding the serious business depression, the finances of the American Mining Congress are in a healthy condition, and this in the face of the great drains upon our resources resulting from the expenses arising from the publication of the "Mining Congress Journal." This has proved a valuable aid to this organization, if we are to judge by the many favorable comments received.

The organization of several new State Chapters prompts the opinion that we are making headway, but it is evident that only by continued and unceasing efforts will we be able to accomplish our aim.

The cordial co-operation accorded me by the membership and the directors and officers is gratefully acknowledged.

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What the Bureau of Mines in the Department of the Interior is Doing and Hopes to Do for the Metalliferous Mining Industry.

BY VAN H. MANNING,

DIRECTOR OF THE BUREAU OF MINES, WASHINGTON, D. C.

Before making a general statement of what the Bureau of Mines of the Department of the Interior has done, is doing, and hopes to do for the metalliferous industries, I shall call attention to the purpose of the Bureau of Mines as conceived by the late director of the bureau, Dr. Joseph A. Holmes, and as embodied in the organic act outlining the bureau's duties. This purpose, which has the loyal support of the present Secretary of the Interior, is to conduct in behalf of the public welfare such fundamental inquiries and investigations as will lead to increased safety, efficiency and economy in the mining and metallurgical industries of the United States. Such investigations must of necessity be general in scope and national in character.

A basic principle underlying the work of the bureau is that the investigations it conducts and the recommendations it makes are not for the benefit of private enterprises or properties. The bureau stands for all alike, and its investigations concern the mining industry as a whole.

It is no wonder that you men from the West, especially those of you interested in the mining and treatment of ores and metals, ask what you may expect from the bureau and what it hopes to do for the industries you represent. For this reason you may wish to know something of the history of the bureau and the causes that led up to its establishment.

The work of the bureau was initiated with fuel investigations in 1904 and mine accident investigation was begun in 1908 under the United States Geological Survey. The segregation of this work and further enlargement under the Bureau of Mines became effective July 1, 1910. Under the Geological Survey fuels and structural materials were tested and investigations of the causes and the prevention of coal-mine explosions were begun. The creation of the bureau

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was due primarily to a general desire for the extension of the work into metal mining and other new fields.

During the past five years—the life of the bureau—its chief work under the wording of appropriations made by Congress has been centered on efforts to bring about greater safety in coal mines, by testing and approving better types of explosives, miners' lamps and electrical and other equipment, and by recommending safer methods. The first appropriation for inquiries and investigations into the mining and treatment of ores and other mineral substances, with special reference to safety and waste, was not made until 1912. Prior to this appropriation the bureau was able from other appropriations, although these were inadequate even for urgently needed investigations relating to coal mining, to conduct preliminary inquiries of a few metal-mining problems because of the bearing of these problems on the coal-mining investigations. However, as the appropriations for metal mines and metallurgical work are small, the bureau's work has been confined largely to investigations of coal-mine accidents and the study of preventive measures that, if adopted, will save many lives and much suffering among miners each year.

The more important work that the bureau has done in relation to the metal-mining industry is briefly summarized here:

Benefits from Metal-Mining Investigations.

The bureau has studied the smelter-smoke problem with the purpose of aiding the development of methods whereby damage to vegetation from smelter fumes may be greatly lessened, if not prevented, and smelters that are now closed by litigation over such damages may be enabled to operate and to take ores from mines now idle through lack of a market.

Investigations of the effects of silicious rock dust in mine air have shown, in one important lead and zinc mining district, an excessive prevalence of silicosis and tuberculosis from breathing air containing such dust, and have resulted in remedial measures being originally undertaken by mining companies and state officials.

A method of concentrating the carnotite ores of Utah and Colorado has been devised by which thousands of tons of material that under former methods would have been allowed to go to waste have been utilized and thus become a source of profit to the miner.

A process has been perfected by which radium, needed for the treatment of cancer and other malignant diseases by Government hospitals, can be recovered from these carnotite ores at a cost that is one-third of the price formerly asked by foreign producers.

Investigations of explosives for use in metal mines have shown

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the need of explosives giving off minimum amounts of noxious fumes, and have led to the manufacture of improved types of explosives.

The bureau has published as a basis for the increase of safety in metal mining an annual statement of accidents in metal mines and metallurgical works in which, for the first time, accidents in these industries have been grouped by states and causes, so they can be directly compared.

Investigations of mine lamps have shown the advantages of acetylene and electric lamps for metal miners, and are resulting in such lights replacing candles and torches, which have caused many fires in mines.

Extension of mine rescue and safety training into metal-mining districts has resulted in hundreds of metal miners being trained in first-aid and mine-rescue methods, and has stimulated the formation of mine-rescue corps and the purchase of first-aid and rescue equipment by mining companies.

Studies of tungsten and molybdenum ores by the bureau are developing improved processes of concentration, which, it is believed, will make possible the profitable reopening of many small mines now idle.

Studies of methods of concentrating lead and zinc ores have shown mine owners where losses occur, and how a greater percentage of the metal in the ores can be reclaimed.

Titaniferous iron ores have been investigated in order to determine the practicability of separating the iron and titanium minerals by electric concentrators, and also the possibility of smelting such ores directly in blast furnaces, the purpose of these investigations being to help make available as sources of iron large deposits of titaniferous ores now unworked.

An investigation of methods of treating low-grade complex ores such as are found in many districts throughout the Rocky Mountain States is showing what methods may be commercially used for recovering metals in these ores and thereby make available millions of tons of ore now unworked.

A study of the causes of mine fires has shown how many metal-mine fires have started, and the bureau has pointed out the precautions to be taken against such fires and the best methods of fighting them.

Studies of ventilation in metal mines, though of a preliminary character, have shown the need in many metal mines of better methods of ventilation in mines.

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An investigation of placer-mining methods, now in progress, has already shown how some of the losses of precious metals at gold dredges can be obviated or prevented.

The bureau has given much attention to the development of laws to increase safety in mining, and has just published comprehensive rules for metal mines, which are intended as a guide for State officials and officials of mining companies in framing better laws and regulations.

The bureau's fuel-testing investigations are showing how greater economies can be effected in generating power for mines and mills, and how low-grade fuels can be used advantageously in regions where high-grade fuels are costly.

In presenting this summary of accomplishments, I wish you to understand that I do not claim that they represent the work of the bureau alone. The active co-operation of other Government bureaus, of State inspection departments, and finally, and most important, co-operation with many individuals is gratefully acknowledged.

Safety Work of the Bureau.

I do not feel that I am claiming too great credit for Dr. Holmes when I say that he chiefly was responsible for the nation-wide progress of the "Safety First" movement, which has now reached every industry in the country. His belief that safety implies efficiency and that true efficiency insures safety is shown by the motto that he adopted for the Bueau of Mines—"Safety and Efficiency" in the mineral industries. His keen realization that the bureau by itself could do little to insure improvement is shown by the following extract from his last annual report:

"In conducting its campaign for the increase of safety and efficiency in the mining industries there has been adopted the following general plan of co-operation between the National Government and other larger agencies: (1) That the National Government conduct the necessary general inquiries and investigations in relation to mining industries, and disseminate in such manner as may prove most effective the information obtained and the conclusions reached; (2) that each State enact needed legislation and make ample provision for the proper inspection of mining operations within its borders; (3) that the mine owners introduce improvements with a view to increasing safety and reducing waste of resources as rapidly as the practicability of such improvements is demonstrated; and (4) that the miners and mine managers co-operate both in making and in enforcing safety rules and regulations as rapidly as these

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are shown to be practicable. The States, the miners and mine owners, and other agencies, such as the mining and engineering societies, are now showing a commendable willingness to co-operate with the National Government in this work."

I sincerely hope that the spirit of co-operation which Dr. Holmes aroused will continue to spread and grow greater and that the bureau may work in full sympathy with the desires of the mining industries of the country.

New Mining Experiment Stations.

The need of mining experiment stations through which the Federal Government could extend to mining some measure of the liberal aid it has long given that other basic industry, agriculture, by the establishment of 52 agricultural experiment stations and the expenditure of hundreds of millions of dollars, was strongly presented to Congress by the Secretary of the Interior, and as a resudt of the sympathetic interest of Secretary Lane in the efforts made by Dr. Holmes for the betterment of mining an act providing for the establishment and maintenance of 10 mining-experiment stations and 7 mine-safety stations in addition to those already established was passed at the last session of Congress. The enactment of this legislation, the last in which he was actively interested, stands preeminently as a monument to the creative force and energy of Dr. Holmes.

The conduct of experimental work for the whole metal-mining industry from one central station in one of the metal-mining States was seen to be impracticable because of the vast area over which the ores are scattered, the varied nature of the ores and the conditions under which they must be developed. Therefore, when the plan of establishing several stations was approved, it was decided that the greater number of these stations should be located in the Western States. It is expected that each State in which a station is located will co-operate in the study of mining problems by supplementing the appropriations to be made by Congress, the States' efforts being directed to such investigations as are distinctly local in character, while the Federal Government investigates those problems that are more general and national in character and importance. Under the terms of the act three of these mining-experiment stations are to be established each year under the appropriation made therefor.

Production of Radium—Treatment of Carnotite Ores.

Some of the more notable achievements of the Bureau of Mines

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I have already mentioned. One of these is the production of radium on a commercial scale from Colorado ores by a process that is much cheaper than other processes and is cheaper even than was predicted by the bureau. By this process 1 gram of radium can be produced by the bureau at a cost of $36,500, this figure including cost of ore, insurance, repairs, amortization allowance for plant and equipment and all other incidental expenses. I hope that you will not think that I have any desire to boast of what the bureau has done, but when you remember that radium has been selling for $120,000 to $160,000 per gram, this accomplishment of the bureau will, I trust, seem worth while.

The first important result of the bureau's radium investigations was to increase the price the miner received from the foreign buyers of the ore. When the radium investigations began in 1912 carnotite ore carrying 2 per cent uranium oxide was selling at approximately $75 per ton f. o. b. New York, a figure that certainly did not pay the cost of mining and shipment. During 1913 and the early part of 1914, through information the bureau published in regard to the export of American ores and the value of these ores, the price increased and had fully doubled by the time the European war began.

The ores from which this rare metal is extracted are few and the deposits are not inexhaustible. For this reason it is highly desirable that the Government take action that will prevent so much of this ore as now remains in its possession from being wasted or monopolized. The only fields of carnotite ore known today are in Colorado and Utah, and these fields cannot supply ore for many years of such mining as prevailed at the beginning of the European war. Meanwhile, the demand for radium is bound to increase rapidly as the value of the radium emanation in the treatment of disease is demonstrated. By its use some of our eminent surgeons have obtained remarkable cures of cancer.

Having thus briefly called attention to some of the things the bureau has done, I will ask you to consider a few of the things the bureau should do and can do as appropriations are made for the advancement of metal mining in the Western States.

Improvements in mining and transportation have brought great changes to the metal-mining industry. Low-grade ores that were formerly left in the ground as worthless are now being mined, and waste dumps and piles of tailings are being treated at a profit. The great problems that confront the mining industry of the West today are the development of cheaper methods of mining and mill-

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ing of low-grade ores and the devising of metallurgical processes that will extract the relatively small metal content at a profit. To reduce the cost of handling and treating ores the application of the best existing methods and the development of new methods are required. Only the larger companies can afford to carry on necessary investigations for themselves. Experiment is beyond the reach of a small company with limited capital. Furthermore, there is need for a national agency for gathering and distributing information of value to everyone engaged in the industry, and for making such recommendations as will best assure adoption of safer and more efficient methods. It is in work of this kind, work that deals with general and fundamental problems whose solution is necessary to the upbuilding of an industry, that Government activity can prove itself of most value.

The United States Geological Survey has done much to increase our knowledge of the character, geologic relations and areal extent of the mineral resources of the West, and several States have ably assisted its work. The work of the Federal Bureau of Mines begins where the work of the Survey ends. Investigations to determine how mining methods can be made safer and more efficient, how milling and metallurgical methods can be improved so as to assure a larger extraction of metal, reduce waste and avoid damage to other interests, and how ores or mineral substances now unused can be made a source of wealth—these are all within the scope of its duties as defined by Congress. Much of the work that the bureau is doing in the West is in only the initial stage. At present activities are largely centered at three points.

Investigation at San Francisco.

At San Francisco the smelter-fume investigation is in progress. Here the chemical changes involved in the roasting and smelting of sulphide ores, the formation of compounds that make smelter smoke injurious to vegetation, and the methods by which the damage can be lessened or prevented have been and are being carefully studied in the laboratory and investigated at smelting plants in co-operation with other agencies attacking the same problems.

The work of the Selby Smelter Commission, of which Dr. Holmes was chairman, deserves notice. This commission, composed of disinterested experts, investigated the question of damage from the Selby smelter, a question that had given rise to protracted and costly litigation, and embodied its findings in an exhaustive report that is being published by the Bureau of Mines. The methods used

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by the commission have been adopted in other investigations of smoke damage.

The importance of the smelter investigations lies not only in the possibility of their showing how substances now wasted in smelter smoke and fume can be recovered and utilized with profit, but also in the probability of their demonstrating how smelters that have been closed by litigation over smoke damage may be operated without doing injury, and thus become buyers of ore from local mines that are now unworked because of the lack of markets.

Recently at San Francisco the bureau has begun a preliminary investigation of the hydrometallurgy of gold and silver ores, in the effort to develop uniform tests and to make improvements in various details of the cyanide process, with a view to increasing its efficiency. At present the work is confined to the cyanidation of silver ores from Nevada, and is receiving active co-operation from the Nevada Mine Owners' Association.

Another investigation being conducted through the San Francisco office relates to placer mining, including the operation of gold dredges and the working of hydraulic mines. This investigation consists largely of field studies, though it is hoped that various special problems will later be studied by laboratory methods.

Investigations at Denver.

To the importance of the radium investigations being carried on at Denver I have already called your notice. Other work being done at Denver includes studies of the minor metals, such as tungsten (used in the filaments of electric lights and in special steels) and molybdenum (needed in the manufacture of alloy steels) and others, many deposits of which are scattered through the mining districts of the West but are unworked because of the difficulty of mining and concentrating the ores profitably with existing methods. Already these investigations have shown that by improved concentrating methods devised by the bureau's engineers deposits of molybdenum ore now lying idle can be worked profitably.

Investigations at Salt Lake City.

At its Salt Lake City station the bureau is conducting, in co-operation with the University of Utah, investigations to ascertain the extent of the low-grade and complex ores carrying gold and silver with copper and lead or zinc that are now unworked but will become of value with the development of a practicable process for recovering the metals. In these investigations the extent of the low-grade and complex ores in the State of Utah has been

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determined, and it is planned to make similar examinations in Idaho and other adjoining States. Meanwhile, various methods of concentrating and treating these ores are being tested in the laboratory and are being studied at mills, in the attempt to devise more efficient and economical methods than those now in use. Vast quantities of these low-grade ores await treatment in the older mining districts of Utah and adjacent States, and the development of efficient methods of treatment will increase the value of the mineral output of these States by millions of dollars.

In addition to the work for the advancement of metal mining that the bureau is doing through these stations, such of its mine-rescue cars as could be spared from urgently needed work in the coal fields of the country have made a beginning in training metal miners in first-aid and rescue methods. The mining engineers in charge of these cars have been investigating those phases of lighting, ventilation and the use of explosives that are peculiar to metal mines, and have prepared reports embodying recommendations for the prevention of accidents and the use of safer devices and methods.

It is hoped that at the next session of Congress provision will be made for the purchase and equipment of three new mine-rescue cars authorized, thereby enabling a much needed extension of rescue- and first-aid training in the metal-mining States.

Some Things That the Bureau May Help to Bring About.

The metal-mining investigations and inquiries that might be profitably followed by the Bureau of Mines are so many and various that I will not attempt to mention them all. As a suggestion of what the bureau may be able to aid in accomplishing, I offer the following summary of some mining and metallurgical problems, and a brief statement showing how large are the imports of some metals and minerals that are found in this country but are not produced here, or are produced only in small quantities:

In the mining and metallurgy of the precious metals there remains the possibility of recovering a larger amount of platinum and other metals of the platinum group from gold placers, and also the possibility of devising processes for extracting gold and silver profitably from low-grade complex ores. Many gold and silver ores contain a considerable percentage of zinc, but until recently little or no attempt was made to recover this metal. Losses in the mining, milling and metallurgy of zinc ore are startling. At many districts in the West, owing to high freight rates and high smelter charges, much low-grade zincky ore is left in the mine or on the

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waste dump. In concentrating zinc ores the total metal losses may amount to 30 to 35 per cent. In the treatment of complex zinc-bearing ores by present methods some of the contained silver, lead or copper is often wasted. On the other hand, if the ore is treated for its copper content, for instance, not only is the zinc wasted, but a penalty is charged, depending on the amount of zinc present, that is often as high as $5 or $6 a ton. The total loss in the metallurgy of zinc ores, from the ore in the ground to the manufacture of spelter, is rarely less than 50 per cent.

As regards copper ores, large deposits still remain unworked, and the percentage of metal recovered in many mines is lower than it should be. The total waste from ore to refined copper in many instances is 30 to 40 per cent of the metal in the ore.

In 1913 about 87 per cent of the copper produced in this country came from the Western States. As this represented a recovery of about 70 per cent of the copper in the ore, the annual loss of copper that year in those States alone was fully $70,000,000, or $200,000 a day.

At present the treatment of many copper ores is on the verge of a revolution, as shown by enormous plants just erected in Montana and Chile, through the use of wet methods—leaching and precipitation—in place of ordinary smelting processes.

As regards the total production of other metals, in 1913 the production of tin, antimony, platinum, chromic iron ore and manganese ore in the United States amounted to only $130,000, whereas the value of these same minerals imported into the United States in that year was nearly $56,000,000. The most important item in this list was tin, the output of which in the United States was valued at less than $37,000, whereas the imports were valued at nearly $47,000,000. There are undeveloped tin deposits in California, Idaho, Washington, Wyoming and Alaska, and some partly developed deposits in Texas and South Dakota. At present Alaska produces practically all the tin that is mined in the United States.

The United States produces no antimony, but imports about $1,000,000 worth. Deposits of antimony ore are known in eight or ten of the Western States.

Less than $50,000 worth of platinum is produced in the United States each year, whereas imports are 100 times as large. Platinum is found in nearly every Western State, and is recoverable from many gold placers and beds of black sand.

The production of manganese ore in the United States is valued at about $40,000, whereas the imports are 50 times as large. De-

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posits of manganiferous ores are found in at least eight of the Western States.

Large deposits of high-grade iron ores are found in the Pacific Coast States where as yet there is practically no production of pig iron, owing to the scarcity of good coking coal, and iron and steel are imported or procured through the payment of high freight charges from furnaces further east.

It is my belief that through investigations now under way, and through investigations to be carried on at the new mining experiment stations authorized by Congress, efficiency in mining will be stimulated, new processes of treating ores will be developed, new uses for substances now wasted will be found, and the metal production of the Western States will be increased in value by millions of dollars annually. Also, conditions affecting the safety and health of miners and of workers in mills and smelting plants will be so greatly improved that the present high death rate from accidents will be reduced until American methods in mining and metallurgy will be regarded as no less notable for safety and efficiency than they are now for boldness in new designs, large outputs and low costs.

But the bureau cannot accomplish these ends by itself. It must have the co-operation of State officials, of mining and metallurgical companies, and of the workers in mines, mills and smelters. Acting as an investigator, a guide, having no power to enforce its recommendations, it seeks your aid and will welcome suggestions or advice in regard to the problems it should investigate and the methods it should follow. The bureau has no desire to be dictatorial or arbitrary in its attitude—it endeavors to accomplish its purpose with the least disturbance of existing conditions. As director of the bureau I shall steadfastly endeavor to carry forward its work for the betterment of the mineral industries and I shall constantly strive to make the bureau the great agency for the increase of safety and efficiency.

But the bureau is only one among those in the Interior Department that are working for the public good, and, in conclusion, it gives me great pleasure to assure you that in my efforts as director I shall have the continued sympathy and encouragement of that keen-sighted and broad-minded citizen of California who, as Secretary of the Interior, is doing so much to call attention to the natural resources of the West and the nation's interest in their efficient utilization.

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Plain Writing.

BY DR. GEO. OTIS SMITH,

WASHINGTON, D. C.

Two years ago I spoke to the American Mining Congress on the subject "Plain Talk"—both preaching the use of direct statement and trying to practice what I preached. Of late my thoughts have turned more and more to the need of the use of popular language in stating technical results; hence this afternoon I venture to discuss plain writing from the standpoint of a Government scientist. For twenty-odd years my association with scientists has been fairly intimate and, though I may not qualify in plain writing myself, I can claim large acquaintance with both the written and the printed page whose meaning is far from plain.

Science Is Simple.

At its best, science is simple; for science is not much more than arranging facts so as to set forth the truth. Scientific thought is exact and direct, and scientific writing must therefore be accurate and to the point. The scientist should think directly and with the precision of one of the instruments of his trade, and above all his language must present that thought exactly.

In scientific writing this need of exact statement has led to the use of special terms, words that keep their razor-edge because used only for hair-splitting distinctions. In a certain degree this adoption of words not commonly used is unavoidable and therefore defensible. Yet the practice is carried to an extreme, and far too often the result is a highly specialized language so distantly related to our mother tongue that as a preliminary qualification the writer has to pass a civil service examination, and the reader usually finds himself "shut out" and facing a "no admittance" sign unless he happens to possess the degree of doctor of philosophy in that particular branch of science.

Not to Be Discarded.

Mind you, it would be folly to throw away these tools so well fitted for special purposes; yet it is no more the part of wisdom to put them to everyday uses. The task for the scientist is to decide when to use his technical terms and when to talk United States.

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Of course, any writer's first duty is to be intelligible. Choice of language thus resolves itself largely into an understanding of the audience. If a scientific investigator desires to announce his discovery to his fellow workers, he does well to use those exact terms that carry the same shade of meaning the world over, and indeed may have the same form in several languages; if, on the other hand, his results have immediate value for the mine operator or the prospector, the geologist does not and cannot accomplish his purpose unless he writes in plain language, using words possibly less exact but surely more understandable.

It may be that I have stated the case too simply, so that this matter of plain writing may seem altogether easy, yet making out the prescription is always much easier than effecting the cure. Indeed, I suspect the difficulty is largely an internal trouble with the author, so deep-seated that my simple remedy of fitting the language to the reader does not reach it.

Sir Clifford Allbutt in his "Notes on the Composition of Scientific Papers," lays down the plain rule: "Take pains, therefore, with yourself first, then with your reader." His idea that clear thinking must be the first step to plain writing, of course deserves our endorsement, based upon experience. How common is the sad discovery that a piece of obscure writing is simply the product of roundabout reasoning or twisted thinking. Printer's ink, in whatever amount used, unfortunately possesses no magic properties as a reagent for clarifying muddy thoughts. Yet no doubt it sometimes happens that some of us try to cover up with long words our uncertainty in thinking. So in preaching reform in scientific publications those of us who are doing the work must realize that plain thinking comes first. There's the rub!

Big Men Plain Writers.

It is therefore not a coincidence that some of the deepest thinkers in geological science have also possessed a literary style conspicuous for clarity of expression. On the other hand, some authors whose English needs the most editing are equally careless in their quotation of facts determined by others, and indeed in the statement of their own observations. I mention this simply to show that I am strong in my belief that plain writing is not something beneath the plane of endeavor of the scientific investigator—indeed, it is something so hard to attain that the most of us need to aim high, to raise our standards of scientific thinking. The use of com-

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mon words is worthy of any writer if his purpose is to transmit thought.

The discussion of plain writing at this time is not academic, because my real purpose is to take this opportunity to announce to you the policy of the United States Geological Survey on this subject. Our explorations, surveys and investigations are in the public interest only as results are made public. This policy is as old as the Geological Survey itself, but several things have given a special impetus to the development of this policy. Beginning in August, a year ago, a large volume of inquiries from producer and consumer of minerals came pouring into our office, and as never before the Geological Survey became a kind of "Central" to the mineral industry. This opportunity for a larger service to the public not only resulted in gratifying relations with a large number of correspondents, but the rendering of such service has proved instructive to the public servants charged with the duty. Many of us on the Survey staff have acquired a keener realization of the need not only of giving the public facts, but also of making those facts intelligible and useful to the citizen who may lack professional training in geology or engineering.

The Guide Books.

Another line of this larger service has been the issue of four guide books to this great Western country, in which the purpose has been to inform the traveler concerning the resources of this part of our country as well as to unfold to him in attractive form its fascinating geology. The effort to meet the public need of authoritative information of this type seemingly has met with success, and other guide books in this series will follow in other years. More than that, however, the reflex influence of this innovation is already felt, and the evident appreciation by the general public of this type of popular description is encouraging the Survey writers. The educational responsibility of this Federal service is being more fully realized, and we intend to give much more attention to the simplification of the language of the professional publications and to the issue of reports that shall be popularly descriptive and instructive without loss of exactness. Even if plain language is used, our reports should be no less efficient vehicles for professional discussion or for announcement of geologic discoveries.

For General Public.

For thirty-six years the United States Geological Survey has reached an ever-widening circle of readers, and even in those first

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years of the Survey's life Kind and Emmons and Gilbert gave to the West the results of their work in strong and forceful English. Yet with the growth of the organization and the development of the science the tendency toward highly specialized writing has been too marked, and the present plea for plain writing has become necessary. The Government scientist has at least two obligations; first, that of making his investigations more and more exact in method and direct in result; second, that of making his product, the written report, such as to meet the needs of not only his professional associates but also the general public. It is our ambition that the reports of the United States Geological Survey shall be written in the language of the people.

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Prejudice Against Regulation.

BY RUSH C. BUTLER,

FEDERAL TRADE ADVISORY COMMITTEE OF THE CHAMBER OF COMMERCE OF THE UNITED STATES.

It is the fashion to decry governmental regulation. It is repeated ad nauseam that honest industry has found little or nothing helpful in legislative enactments and is in a state of collapse under the strain of regulatory statutes. The Act to regulate commerce, the Elkins law, the pure food and drug act, the Clayton and Federal Trade Commission laws are cited as specific instances of legislative oppression of business. It is asserted that these laws were enacted upon the assumption that business is dishonest and that they were therefore intended to be and have resulted in being destructive and not constructive in their effect upon business. However little truth there may be in these charges, and however weak may be the logic of the argument which supports them, they have been so frequently and so vehemently stated that they find unwitting indorsement in the minds of many people. The Sherman law, too, is condemned as a regulatory statute. Why should the sins of the Sherman law be invoked in condemning regulation? The Sherman law does not provide for regulation. It is declaratory—not regulatory. Had it contained regulatory provisions we should have long since witnessed the solution of many problems of regulation that are still unsolved. The real relation of the Sherman law to regulation and the possibility of their co-ordination without further legislative enactment will, I hope, be made clear as we proceed.

Regulation Is Constructive.

But is it true that the strictly regulatory statutes have been destrucive either in intent or results? The earliest law of which complaint is made is the act to regulate commerce, passed in 1887. Amendments to the act have eliminated entirely the strongly entrenched system of direct rebating. If this one item all by itself does not make the act a piece of constructive regulation I shall have to be convinced of it by the word of some one other than the man who no longer receives the rebates, or of some one other than a selfish agitator. If you require proof that it is constructive legis-

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lation, ask the traffic manager of the railroad who by force of the inevitable pressure of the old regime dishonored himself, his office and his country by paying the rebates, but who now, thanks to the law of his land, is free to hold an honest position as an honest man. Not only has the elimination of rebating restored to the man who actually gave and received the rebates the opportunity of being honest, but it has put all the business of the country upon a higher moral plane. This is common comment, particularly among railroad men themselves.

Amendments to the act to regulate commerce have reduced to a minimum unjust discriminations and undue preferences and advantages. The weak are given their place with the strong. The many are not sacrificed for the few. Morally, as well as legally, the act has been intensively and broadly constructive. If there be, as it seems to many there is, occasion to complain that the act is destructive in that by reason of regulation thereunder some carriers are not receiving the full measure of just and reasonable rates to which they feel themselves entitled, such condition only reflects the present status of the evolutionary process which must be experienced during the period of readjustment of the physical and financial affairs of such of the carriers as have been looted, robbed and plundered because, if you please, of the very lack of regulatory legislation making such practices possible. The railroads whose management has been capable and honest are benefiting rather than suffering by reason of regulation. In spite of the harshness of some of the requirements of regulation, you will have difficulty in finding a single railroad manager who advocates the abolishment of the federal regulatory statutes and a return to the practices of the olden days.

Pure Food and Banks.

What of the pure food and drug act of 1906? It has made the pretenders, the falsifiers, the dishonest venders of dishonest goods either quit business entirely or tell the public the truth about the articles they offer for sale.

What of our national banks? They always have been subject to federal regulation to the minutest detail. Isn't it, after all, more or less a question of viewpoint? Does not our like or dislike for a thing greatly depend upon whether or not we are accustomed to it? Can you imagine any line of business that is conducted more honestly or legitimately or that results in giving better service to its customers or in paying better dividends to its owners than the

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business of the banks regulated by the federal government? I can imagine no more glorious outcome for the regulation of industrial corporations than that at the end of ten or twenty or even fifty years they shall be as well conducted, giving as good service to their patrons and affording their owners as safe and sure returns as do our national banks at the present time.

Consideration of other regulatory statutes would further show that their intent was helpfulness—destructive, if you please, of evil practices or evil results, but broadly, humanely constructive. The Safety Appliance Act no doubt placed much death-dealing railroad equipment on the junk pile. If this is destructive, let the detractors of regulation make the most of it. But the same act has placed in the service of the carriers millions of engines and cars equipped with modern devices safeguarding the health, limbs and lives of railway employes, passengers and the public.

Regulation is constructive. Its fate is not to be determined by the voice or votes of those from whom it has taken or to whom it has denied undue privilege. Regulatory statutes no more assume business essentially dishonest than statutes making stealing a crime assume all men to be thieves. Because the Rock Island was purchased with criminal intent and some years later thrust into a scandalous receivership is no reason why the Burlington, the Northwestern or the Santa Fe should be considered outlaws. Argument based upon such assumption is the first resort of the business man with dishonest motives.

Commissions of Experts.

If those of you here assembled were certain that in the progress of governmental regulation it would sooner or later be brought about that the mining industry would be regulated by a board of responsible business men, the majority of whose members were fairly representative of the mining industry, there can be little doubt that you would pledge your support to any just and proper means to the accomplishment of that end. I have faith that such an outcome is reasonably to be anticipated. Such is clearly the tendency of the times. I believe that ultimately regulation of all kinds will be placed in the hands of those familiar with and friendly to the industry regulated. The personnel of the present Federal Trade Commission gives such a promise. I believe that the idea of regulation now entertained by the comparatively few, namely, that it must be expert, efficient, helpful and conducted along sane, business lines, will become the idea and the ideal of all our people. Such a

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type of regulation does not mean paternalism. It means that each line of industry and each person engaged in it will have the widest latitude for individual action. Such form of regulation does not mean inquisition. It does not mean annoyance by official investigators. Espionage is not a part of the system. The national banks have never had occasion to complain of the fact that federal examiners had freest access to their books. Industrial corporations under the kind of regulation they can assist in bringing about will have as little fear of examination as do the national banks.

Attitude of Industry Toward Commission

That all regulation is justified no one will claim. That it can be improved none will deny. But it is here to stay. Commissions are to become more largely concerned with business. The extent to which they may become helpful depends in large measure upon the spirit manifested toward them by business. It was not long after the Federal Trade Commission law and the Clayton law became effective that Mr. Wheeler, former president of the Chamber of Commerce of the United States, urged, in his forceful and convincing manner, that the business men of the United States lend their hearty support to the efforts of the Federal Trade Commission to make the new laws helpful to business. Mr. Wheeler said:

"To make my point clear, I want to suppose that immediately after the appointment of the Interstate Commerce Commission in 1887, the railroads, instead of contending against the proposed regulation, had recognized the right of the government to intervene and had, through a well-intentioned and broad-minded committee, given co-operation to the Interstate Commerce Commission from the beginning of its deliberations. Such co-operation would, I contend, have smoothed out many of the rough places, have saved the Commission from many errors, the railroads from infinite loss and the nation from a sorry exhibition of dishonest flotation and inefficient operation."

And applying this illustration to the relationship then about to be established between industrial business and the Federal Trade Commission, Mr. Wheeler stated it seemed to him particularly necessary that business should organize to co-operate with the Commission rather than assume the attitude of being critically indifferent or positively obstructive. It was due largely to Mr. Wheeler's initiative and efforts that the Federal Trade Committee of the Chamber of Commerce of the United States was formed. It is hoped that the committee may be able to co-operate with busi-

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ness men of the country in whatever industry engaged and with the Federal Trade Commission, to the end that an early and sympathetic understanding may be had between the regulating body and the regulated industries.

Co-operation of Business Men Necessary to Successful Regulation.

Business may best co-operate with the government by accepting the legislation now on the statute books as reflecting the best opinion of the time and by adjusting itself to the new order of things. The laws are not perfect and perhaps never will be, but business men may now have a larger voice than ever before in bringing about amendments to the laws along lines shown by their experience to be necessary. Business men are today co-operating with each other more intimately than ever before. There are literally thousands of organizations of business men throughout the country. Their purposes are lawful and laudable, and their tendency is all toward bettering not only industrial but all human conditions. Their contact with regulating bodies brings to legislative and executive officials appreciation of the fallacies and weaknesses of existing laws and points out the proper basis for amendatory enactments. If a commission sympathetically reflects to the legislative body the necessity for amendatory legislation, how much more easily will it be obtained. Not only this, but a commission may often by its own conduct so exert its powers in a proper manner as really to afford relief not provided by direct statutory amendment. The importance of harmonious co-operation between regulator and regulated is therefore all the more apparent.

Commission's Power to Help.

Specifically as to the ability of the Federal Trade Commission to help business, it is first to be noted with gratification that the attitude of the commission is entirely favorable and friendly. In this it represents the changed ideas of the present day. Some doubt has been expressed whether the powers of the commission are broad enough really to enable it to be helpful. Personally I do not share in that doubt. In the proper exercise of the powers conferred upon it, the commission can and will be a source of great assistance and relief to the business world.

The commission is authorized to exercise functions of two different kinds. The first may be called judicial, in the exercise of which it files complaints, holds hearings and enters orders. In the exercise of its judicial functions the commission is given the opportunity of passing upon complaints concerning every con-

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ceivable form of alleged unlawful business practices. Each case considered by the commission will naturally be decided by it, an order will be entered either dismissing the complaint or granting relief, and a full and complete opinion will be prepared and published by the commission setting forth its reasons for its conclusions. It will not be long therefore until the ideas of the commission with reference to what facts do and what facts do not constitute violations of the law will be known to the public. The commission's opinion will constitute guides for business. Its findings of facts are declared by the law to be binding upon the courts. As with the Interstate Commerce Commission, that order of the Federal Trade Commission will be rare indeed which the courts will modify or annul. As the commission is composed of business men, business men will pass upon business practices. Owing to the conclusiveness of its findings of fact the commission has been quite properly referred to as the Supreme Court of business. Those of you who are tired of having your motives impugned and your acts held for naught by lawyers and judges said to be lacking in business experience will find great relief in the new order of things.

Inquisitorial Function.

The other function of the commission may be called inquisitorial. The use of the word in this connection may not be altogether happy, for neither the Clayton law nor the Federal Trade Commission law is intended to impose upon the Trade Commission the duty of conducting an inquisition or ferreting out crime. Rather, the attitude assumed by the commission in making investigations may more properly be regarded as similar to that of the Treasury Department in making examinations of national banks. The commission's powers of investigation apply to corporations only. The commission has no power to investigate the business of individuals or partnerships. That the commission's powers of investigation are intended to be helpful is evidenced by numerous provisions of the law. Section 6, paragraph (e), of the Trade Commission law provides that the commission may investigate and make recommendations for the readjustment of the business of any corporation alleged to be violating the anti-trust acts in order that the corporation may thereafter maintain its organization, management and conduct of business in accordance with law. This provision is for the specific purpose of permitting any corporation violating the law to readjust its business without a decree of court, even before the filing of a suit. It enables the commission and the

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Department of Justice to co-operate with the particular industry involved, thereby avoiding the expense, annoyance, publicity and other evil effects attendant upon litigation. It enables the commission to establish definite guides for the future conduct of the particular business. This is an exceedingly helpful and constructive provision, which standing alone justifies the enactment of the law.

Paragraph (f) provides for annual and special reports of the commission to Congress and for the submission of recommendations for additional legislation and for the publication of the commission's reports and opinions.

Paragraph (g) authorizes the Commission to classify corporations. This permits the commission to require reports from only such corporations as it may deem advisable and thereby relieve a large number of corporations with which it may well know in advance it will have no concern from the expense and annoyance of making unnecessary reports. This power of classification is unlimited, thereby permitting the commission to make as many divisions and subdivisions in classifying, even within a single industry, as it may feel proper or necessary to make in order effectively to accomplish desired ends.

Paragraph (h) provides that the commission shall investigate trade conditions in and with foreign countries and report to Congress thereon with its *recommendations*. This provision is for the evident purpose of promoting our foreign trade.

It is especially to be noted violations of the Federal Trade Commission law and the Clayton law are not made criminal offenses, clearly indicating that Congress considered criminal provisions undesirable and unnecessary.

Powers Not Conferred by Law.

In addition to the judicial and inquisitorial functions which may be exercised by the commission it naturally as an administrative body has effected a business organization for the purpose of enabling it to perform its duties. It has provided rules and regulations for the conduct of its own business, and will soon have established a workable business routine. This necessarily gives it certain administrative powers not specifically provided by law, and which will no doubt reflect business ideas in this department of the government. To illustrate: Very soon after the commission organized it caused to be given wide publicity a statement prepared by Vice-Chairman Hurley concerning uniform cost accounting systems. The commission is convinced, as are a great many business

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men, that much unfair competition is due to ignorance of the cost of production on the part of manufacturers and producers. The commission considered that it could be constructively helpful to business by standing sponsor for the idea of uniform cost accounting systems. The problem involved is receiving detailed and expert consideration by the commission. There can be no doubt that it will not be long before the commission will be in position to give valuable assistance with reference to cost accounting applicable to all the various and diversified lines of industry.

The question is often asked, "Is there any lawful basis upon which competitors may co-operate in the actual carrying on of their business?" Assuredly yes. While the legal limitations on such co-operation constitute one of the greatest menaces to business, there are several plans of co-operation in effect, some of which have received the tacit, if not the expressed, approval of the government. There is the open competition plan, the closed transaction plan and the common selling agency plan. Still other plans are believed to be legal when applied to industries substantially all of whose members, due to stress of conditions either temporary or permanent, are selling at less than cost of production. Any industry desiring the assistance of the commission will probably have to devise its own plan, whether it be for co-operation of competing industries, or whether it be with reference to the inner workings of an individual industry. It is not probable that the commission will assist in the formation of a plan, but if the workings of a specific plan are presented to the commission there is reason to believe that they will be given careful and expert investigation and that in due course the commission will make its report thereon, either approving or disapproving part or all thereof.

The Commission and the Sherman Law.

While Congress has declared specifically that the Federal Trade Commission law should not be construed to alter, modify or repeal the Sherman law, it is apparent that if the views herein expressed properly interpret the commission's powers, the drastic provisions of the Sherman law, while standing unaltered and unamended on the statute books, will need to be invoked only for the punishment of flagrant violations. When guides for business have been well established by the commission the man who violates the Sherman law will do so at his own peril and, if prosecuted criminally therefor, will receive little sympathy from his fellow business men.

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The Clayton Law's Inhibitions.

In the Clayton law Congress expressed its emphatic disapproval of four specific things, namely:

First—Price discrimination between two persons buying under exactly similar circumstances and conditions.

Second—So-called tying contracts requiring the purchaser to agree to handle no goods of a competitor of the seller.

Third—The ownership of stock by one corporation in another whereby competition is lessened; and

Fourth—Interlocking directors under certain conditions.

These things are flatly declared unlawful and the Federal Trade Commission is authorized and directed to file complaint against violators of these provisions and require discontinuance of the practices. The things thus condemned might have been included within the unfair methods of competition which were declared unlawful in the Trade Commission act, but evidently Congress deemed each of the things injurious to the public and did not wish to leave it open to the commission to find that any one of the four acts specifically condemned was proper or lawful or to be in any way excused, and therefore placed its stamp of special disapproval upon each and all of them.

Labor Exemption Clause.

Much might be said with reference to the labor exemption clause of the Clayton law. Whether the effect of the clause will be helpful or harmful to labor remains to be seen. To whatever extent it proves to be unduly helpful to labor, it will to that same extent necessarily be unduly harmful to industry. If it proves unduly helpful to labor it is fair to assume either that it will be repealed or that it will be used as an entering wedge to bring about the enactment of similar provisions definitely and specifically enabling industry to co-operate along similar lines of mutual helpfulness.

Unfair Methods of Competition in Commerce.

The Federal Trade Commission law lays down the broad rule that unfair methods of competition in commerce are unlawful and gives the commission the power to ascertain in specific instances whether or not any method complained of is unfair. If the commission determines that a method is unfair it is permitted to file a complaint against the offending party only in the event it further appears that the filing of a complaint would be in the interest of the public. This is an exceedingly liberal provision of the law,

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It expressly indicates congressional approval of the idea that petty fights among competitors, even though they may involve the employment of unfair methods of competition, are not of sufficient importance to invoke the attention of the government, unless interests other than those of the immediate parties to the controversy are involved.

Sherman Law Is for the Protection of Public and Not Private Interests.

The Supreme Court of the United States, by judicial interpretation, has placed substantially the same limitation upon the application of the Sherman law, namely, that it cannot be invoked for the protection of the interests of an individual, but only on behalf of the public. In the case most recently decided by the Supreme Court involving the Sherman law, viz., United States vs. Delaware, Lackawanna & Western Railroad, 238 U. S., 516, decided June 21, 1915, the Supreme Court says that the anti-trust act "is not concerned with the interest of the parties, but with the interest of the public." The Sherman law is general in its terms and is not limited by express language to such restraints of trade or monopolies as are harmful to the public, but, as stated, the Supreme Court of the United States by judicial interpretation has so limited it, and no doubt properly.

Though it will be a digression, it may be interesting, particularly to gentlemen engaged in the coal mining industry, to consider at this point the decision of the Privy Council of England in the case of the Adelaide Steamship Co., Limited. The case involved the construction of the Australian Industries Preservation act, the general purpose of which is the same as that of the Sherman law. The act provides that contracts intended to restrain trade to the *detriment of the public* and monopolies intended to control commerce to the *detriment of the public* shall be unlawful. It is therefore to be noted that the Sherman law by interpretation of the Supreme Court has been brought to mean exactly the same thing as is provided by the express language of the Australian Industries Preservation act.

The Adelaide case was tried in the lower courts of Australia and taken to the highest court of the country. From there it was appealed to the Privy Council of England. The Privy Council is England's highest court of appeal from the colonies, and in such cases corresponds to the House of Lords, which is England's own court of last resort. In the Adelaide case there sat in the Privy

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Council Viscount Haldane, Lord Chancellor, and three members of the House of Lords. The facts in that case briefly were as follows:

Ruinous competition had existed between two different Australian coal fields. Coal operators began competing with shipping companies which theretofore acted as selling agents. The Privy Council says of the conditions:

"The collieries in the Newcastle coal field were ceasing to pay dividends and falling into the hands of the banks who had financed them; the miners had little chance of an advance in wages though there had been a general advance in prices; and the prosperity of Newcastle, which is dependent on the coal industry and the shipping industry in connection therewith, was seriously threatened."

Australian Coal Combination.

To meet the situation a combination was effected early in 1906, including substantially all of the coal operators in both fields and the principal shipping companies. The combination was worked out through two agreements called the vend agreement and the shipping agreement. The vend agreement fixed uniform wholesale prices for the coal and allotted the trade to members of the combination in certain proportions and limited the output of each. The shipping agreement made the shipping companies the selling agents of the operators, with certain price-limitation provisions. Under the operation of these agreements the selling price of the best coal f. o. b. Newcastle increased from 7s. 6d. to 9s. in 1906, 10s. in 1907 and 11s. in 1908. The Attorney-General urged upon the Privy Council that the contracts in question were so clearly in restraint of trade and so unenforceable at common law as to compel the conclusion that they must operate *to the detriment of the public.* The Privy Council denied the contention of the Attorney-General and said:

"In considering the interests of consumers it is impossible to disregard the interests of those who are engaged in such production and distribution. It can never be in the interests of the consumers that any article of consumption should cease to be produced and distributed, as it certainly would be unless those engaged in its production or distribution obtained a fair remuneration for the capital employed and the labor expended. . . .

"There can be no doubt that the vend agreement was intended to preclude competition in the sense of underselling among its members, and by this means to raise and maintain the price of coal won from the Newcastle and Maitland coal fields. . . .

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"In the present case, however, it was proved that the prices prevailing when negotiations for this agreement commenced were disastrously low owing to the 'cut-throat' competition which had prevailed for some years. . . . It can never, in their Lordships' opinion, be of real benefit to the consumers of coal that colliery proprietors should carry on their business at a loss, or that any profit they make should depend upon the miners' wages being reduced to the minimum. Where these conditions prevail, the less remunerative collieries will be closed down, there will be great loss of capital, miners will be thrown out of employment, less coal will be produced and prices will consequently rise until it becomes possible to reopen the closed collieries or open other seams. The consumers of coal will lose in the long run if the colliery proprietors do not make fair profits or the miners do not receive fair wages. There is in this respect a solidarity of interest between all members of the public. The Crown, therefore, cannot, in their Lordships' opinion, rely on the mere intention to raise prices as proving an intention to injure the public. To prove an intention to injure the public by raising prices the intention to charge excessive or unreasonable prices must be apparent. . . .

"If, as their Lordships think, there was justification for a combination of colliery proprietors to raise the price of coal, it was obviously reasonable on their part to take precautions to secure a market for their coal at the increased price. . . . Their Lordships conclude that neither the vend agreement nor the shipping agreement taken, separately, nor both agreements taken together as parts of a single scheme, can raise any legitimate inference that any of the parties concerned, whether colliery proprietors or shipping companies, acted otherwise than with a single view to their own advantage, or had any intention of raising prices or annihilating competition to the detriment of the public."

If it should develop that ultimately the Supreme Court of the United States shall adopt the same line of reasoning and permit competitors in a demoralized industry to co-operate for the very purpose of avoiding cut-throat competition and increasing the selling price of their product up to a reasonable level, it will not be the first time that the people of this country have gone to the continent of Australia to learn valuable lessons in self-government.

Sherman Law Is Not Applied Against Carriers.

Though two of the earliest cases decided by the Supreme Court, United States vs. Trans-Missouri Freight Association, 166 U. S.,

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290, decided in 1897, and United States vs. Joint Traffic Association, 171 U. S., 505, decided 1898, held that the Sherman law prohibited contracts in restraint of trade among common carriers, the law has been invoked only once in the past eighteen years against common carriers to enjoin rate making by agreement, and then only in a case of greatest emergency. That the carriers make their rates, formulate their rules and regulate their practices by agreements essentially in violation of the Sherman law is conceded on all hands, and yet, by common consensus of opinion of all the people, concurred in by the officers of the government, no prosecution is undertaken because it is realized that it is absolutely essential that the provisions of the Sherman law as construed by the court in the Trans-Missouri Freight Association case, be violated in order that the business of the transportation companies may be properly conducted. It is not at all certain that were the same facts again presented to it, the Supreme Court would adhere to the rigid construction of the law applied in the Trans-Missouri case. There is reason to believe that the court will find in some of the cases now or shortly hereafter to come before it that mere size does not constitute monopoly within the meaning of the law and that all combinations of competing interests, though tending to restrain trade, do not constitute such undue restraints as the law condemns. When the court shall find that there are large businesses resulting from combination of competitors that may lawfully exist, we shall have realized an improved economic situation.

The great truth that the welfare of the individual is the welfare of the nation is coming to be more and more recognized every day. The financial misfortune of a particular industry is becoming more and more a matter of public concern. Where an entire industry suffers while the remainder of the business world enjoys even moderate prosperity, there is indication that something is wrong with our laws or with our methods of enforcing them. If the mining industry languishes while the manufacturing industries prosper, there is evidence of weakness in the machinery of government. Broad, helpful, sympathetic co-operation of business men with each other and with regulating bodies will make the problems of self-government less difficult of solution and insure a greater measure of continuous business prosperity.

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California's Water Infiltration Law.

BY FLETCHER HAMILTON,

STATE MINERALOGIST FOR CALIFORNIA.

Mr. Chairman and Gentlemen: The question of water infiltration in the oil sands is one which has been in the minds of oil men ever since oil has been pumped out of the ground in California, and it is only after years of fighting the problem that public sentiment has been such that some class of legislation has been demanded which would be effective. We have had on the statute books of California a law governing, to a certain extent, the infiltration of water, but this law was not effective because there were no funds provided with which to carry on the law. There was introduced two years ago, or about three years ago now, in the Legislature of California a law providing for the solving of the water problem in the different fields, by district regulation. This did not seem to satisfy the wants of the oil industry as a whole, but the matter was laid on the table until the last session of the Legislature. About six months before the last session of the Legislature convened, the Kern County Oil Protective Association, and also some of the other oil men and oil companies, called upon me to interest myself in the matter of legislation to see if there was not some way of getting the oil men together and making a law which would be effective and satisfactory in its operation in regulating the water trouble. As a result of several conferences with the oil men and hearings before the committees in the Legislature, two bills were introduced in the Legislature for final action. At the last committee hearing, although there was at first some little opposition, a great deal of satisfaction was shown in considering the bill which has now become a law. There were one or two who held out for the old district control bill, but since that time I am glad to say that one of our strongest opponents has come around and said he is perfectly willing to give us his hearty support in the administration of the present law. I might say that the bill as it now exists was passed unanimously by both houses of the Legislature, as there was only one opposing vote, and there was no particular reason for that except for a little personal squabble between two assemblymen.

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The law, in the first place, provides for state control, or rather I should say, state supervision, and provides for an oil and gas supervisor to be appointed, and also for four deputies who will be established in the most important fields in the state. These deputies will have their permanent residences in the fields over which they have supervision, and it is the duty of these deputies to gather all the information possible upon the oil and water question, the logs of the wells, histories of the old wells, the rate of production, and whether or not there is water in all the wells. This enables us to get right down to the bottom of the thing in the first place and make a diagnosis of the disease, as you might call it. The law is rather lengthy in its present shape, but this is due to legal phraseology more than to the duties necessary to be performed. There are only three or four things which are provided in the bill which the oil men are required to do. The first is that the oil men shall provide the State Mining Bureau with as complete and correct logs of all the wells as it is possible for them to give. We realize that for some of the wells the history is unknown, but where it is possible a complete history of all wells is to be given, with the amount of water and gas in all wells. Such data are to be given correctly as nearly as possible to do so. Before any well is abandoned the well owner is required to give notice to the State Mining Bureau, through the deputy state oil and gas supervisor, in order that the well may be abandoned under conditions that may be favorable to the neighbors, and to the oil sand itself in that particular well. The law also provides that where water is to be shut off, the deputy state oil and gas supervisor shall be notified five days in advance of such shut-off in order that a test may be made to satisfy the deputy that the water has been shut off. It also requires that any new well to be drilled shall be reported to the deputy state oil and gas supervisor, and the point where oil or water is expected to be struck shall be given, in order that the field deputy may anticipate, to some extent, just where a well is going to strike oil or water, and he will be required to watch the operation and see that the well is drilled in proper shape. These are the particular points that are required.

It is not with any offensive use of police power that the State Mining Bureau has undertaken this work; it is merely for the best interests of the oil industry that the State Mining Bureau is working. If only one or two deep wells are saved by this work, which would otherwise be lost, the expense will be a financial gain to the producer.

In the matter of providing for the maintenance of this Depart-

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ment, an assessment is to be levied upon the oil producers and oil land owners. The producers are to be assessed a certain fee which is to be established by a Board consisting of the State Mineralogist, the Chairman of the State Board of Control, and the State Comptroller, who are to go over the necessities for the year to follow and estimate the cost of maintaining the Department. The assessment will amount perhaps to about one-half a mill per barrel on the production. The total assessment to be levied is to be apportioned about 90 per cent upon the oil production, and about 10 per cent on land owned. The selection of the oil lands upon which this assessment is to be levied shall be determined by the State Oil and Gas Supervisor. Assessments are to be levied only upon land which is within two miles of producing oil wells. A slight assessment will also be apportioned to the gas wells.

The sum of forty-five thousand dollars is to be appropriated for the maintenance of this department. There can be spent in any one county during any one year, only twenty-five thousand dollars in the repair of old or abandoned wells, or wells which the owners are not financially able to take care of.

In order to make this law enforceable it is provided also that the State Oil and Gas Supervisor shall make rulings upon complaints of the well owners or land owners—or upon his own initiative if he see fit. If complaint be made against any oil operator, and the Supervisor, after proper inspection and proper investigation, make certain rulings, within ten days after that time the owner of the well against whom the ruling has been made, may ask for an arbitration of the question. In that case the well owner, against whom complaint has been made, shall have the privilege of appointing one of the arbitrators; the well owners within a radius of one mile shall have the right to appoint the second arbitrator, and those two arbitrators shall appoint a third arbitrator, and the question shall be finally settled by the three arbitrators. The ruling of the arbitrators supersedes the ruling of the Oil and Gas Supervisor. In other words, after a ruling is made by the Supervisor, it may be reversed by the arbitration committee, and the arbitration committee, which shall consist of the oil men themselves, shall have the right to make any ruling superseding that; so that the oil men, when you come down to the final analysis, have the handling of their own business. In this way the Mining Bureau merely acts in an initiative and supervisory capacity. That is what the whole question has needed in this State, and I think it is the problem that is met with in every state, where there is no head or nucleus to an

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organized effort to get the best of the water question in the oil fields. This was the weak point in the district control, each district following a different method of controlling water infiltration. The practice of cementing wells, and of all oil well operations will be brought together in one central office, and those who are operating in one field will receive the benefits of any new methods that are in use in other fields, a condition which does not exist at the present time to as large a measure as it should. In this way, we shall endeavor, in an educational way, to get the best of the water trouble. We do not claim that all the water in the oil fields can be shut off, or be alleviated, but we do claim that in new work and in re-drilling, supervision can be so ordered that a minimum of damage will ensue. There is a certain amount of good that may be done with old wells.

During September I made a trip through the oil fields with the State Oil and Gas Supervisor, Mr. McLaughlin, and conferences were held in all the oil centers, and the consensus of opinion was that oil men are all in favor of this legislation and were all ready to lend their co-operation to the Department. We put it up to them that there are only two ways in which this legislation could fail; one being that the State Mining Bureau would fail in its administration of the law, and the other that the oil men would fail in their co-operation with the State Mining Bureau. Now if we both live up to our end of it, I think the results to be shown will more than pay for the expense and annoyance that the oil men will receive under its administration. We have outlined to them the fact that we are merely acting as a Department of Government for the benefit of the oil industry and are not going in there with the idea of taking advantage of the powers which are given under the law, because we feel that it will not be necessary to exert those powers. It is possible that a discussion of the oil law itself in more detail may be of more benefit than just a mere outlining of the law as I have given it in an address of this kind, so with that I will close my remarks. If there are any questions, I will be glad to do my best to answer them. (Applause.)

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Federal Control of Water Power.

HON. J. H. RICHARDS,

BOISE CITY, IDAHO.

Mr. President and Gentlemen:

There was a resolution introduced this morning relating to a most important question to the public land states, that of "Water Power Sites." This question is not only important because it touches the very vitals of western development, but also because it affects the very spirit of the relation of the states to our Government. The Committee on Resolutions has just acted on this resolution and will recommend its adoption.

I appreciate the courtesy of being called upon to present for your consideration the questions covered by this resolution, but regret that I have not prepared specially for so important a presentation. I am, therefore, compelled to speak from my general knowledge of the question, gathered from about thirty-five years residence in the public land states, by means of which I have become quite familiar with the needs of such states, and from a knowledge coming through the years of my intimate association with the work of this Congress.

To quite a large extent, this resolution raises certain legal questions coupled with certain governmental policies that have been in vogue for half a century relating to the legal status and disposition of the public domain. That you may have before you more cogently the thoughts I desire to convey, I feel it necessary to digress a little at this point.

As it impresses me, the greatest step ever taken in governmental progress was when the American people established a government by law and not by man because on that proposition rests the hope of the human race. The conflict now raging in Europe arose from a failure to recognize and establish the same form of government and put it into practice in its spirit. The same cry for this form of human relationship has come down through all the ages and that cry will continue until he whose right it is shall reign—a government by law, tempered with mercy, and not a government by man. This is the true basis of all human rights. It is upon this legal basis that I desire to place before you a few thoughts

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for your consideration on the questions covered by the resolution. Our great rebellion became a consuming fire on the question, Shall the rights of human beings be determined by the eternal law of justice, or shall they be determined by man inflamed by selfishness? That question in theory at least was settled by the sword in this country forever, I am sure. Now under that principle of a government by law we must work out our destiny.

It is true that as individuals we may differ as to method, while we agree on the general principle and each acting in good faith. We are here to consider what laws should govern in the use of our water powers, not what man should govern the use of such powers, and the relation of business interests thereto. This being a government by law, the wisdom of the governed in establishing and enforcing the laws by which their rights are determined and established is most essential. This wisdom must largely come through research, thought and experience. To induce this, the citizen must have a large part in establishing and enforcing such laws; because such laws (especially statutory) should be the highest form of expression of the wisdom of the people in the light of their needs, and such laws should be interpreted in the light of the conditions to which they are intended to apply. We behold the infinitude of worlds upon worlds moving in perfect rhythm perpetually by the force of law alone.

It is our desire that the resources of this great West should respond to human need and that our relations to their use shall be directed by laws adapted to western conditions and interpreted and applied in the light of those conditions. These resources may be classified according to source as agricultural and mineral. This classification places water in the mineral class. Every other material resource is destroyed by use, but water as a source of power can only be conserved by use because perpetually renewed. This is one reason why the West feels so vitally interested in this question. By using our water powers we conserve all forms of fuel. This use and the manner of its use touches not only all other forms of industry but the home and commercial activities as well. Therefore we are most deeply concerned not only as to the character of the law that shall govern this use, but more deeply concerned as to its interpretation and application by those understanding and in sympathy with our local needs and conditions.

As a rule, our Federal officers are splendid men; but there is something peculiar about men, for when they taste power they have a coming appetite therefor; they want more. We feel we

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should develop in harmony with local conditions, and as we who are here see those conditions, that we may bring out the best in us. There is too much of an effort to establish theoretical and not practical conservation in relation to the West. I have had a small part in this form of activity and hopes that conservation might be established on a practical basis, but it seems to be all going to theory so far as our water powers are concerned, and I want to keep this thought prominently before you in what I have to say. We feel the need of developing the faculty of initiative in our local activities which is the real genius of human nature; the genius to do things. This form of development is the acme of our hopes. We gain this through the use of natural forces. In local matters, at least, we feel that where we see a need in the form of an opportunity that we are entitled to meet that need by initiating, applying and intrepreting the law applicable thereto which we feel is the enduring basis of true development.

Now the question is before us, Shall the Federal law determine our rights and business relations in our local development? for this question touches every phase of our local, domestic, industrial and commercial life. This brings it very close home to us. We have been led to believe that the United States or this Union was established on the basis that whatever the states did not grant to that Union was reserved to the states. Is that correct? No one doubts it. That being true, you can find no grant from the states to the Federal Government by which the Government can regulate our internal industries, except so far as may be found necessary in interstate commerce, and in some respects covered by what is known as the "police power." We feel that we are standing on a solid foundation when we declare that we have the right to regulate our own internal development according to our own laws initiated and enacted and applied by ourselves. If that is correct, then let us see what should govern our water power development, especially on non-navigable streams.

As I understand such proposed laws as are embraced in what is known as the "Ferris Bill" now before Congress, it is proposed to place this phase of our development exclusively under the control of the Federal laws and have that law applied and largely interpreted by a Federal officer three thousands miles away, with very little knowledge of our local conditions and with very little sympathy, perhaps, with our local development. They propose to tax every horsepower developed by the use of the water which belongs to the state and not to the Federal Government. Is the Government en-

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titled to a profit on the use of the property of the state? This nation has developed into greatness under the public land policy that any portion of the public land can be acquired by a citizen who can make a beneficial use of it. Why should this Government demand a profit from every horsepower developed from the streams of the state? I always assumed that this Government should be supported by the citizen and not the citizen by the Government, and that all income to the Government should flow as directly from the citizen as possible, and that the enduring strength of our Government rests on the strength of its citizenship, industrially, financially, morally and patriotically, and not on the amount of money the Government can make out of our public domain. To have a progressive and enduring form of self-government, the citizen must actively participate in initiating and conducting industrial ventures of all kinds and in the initiation and application of legislation affecting industrial needs, especially in local state units. This develops the citizen and thereby strengthens our government.

The resources on the public domain, so far as directing internal state development is concerned, belong to the state and not to the nation. The nation does not hold public lands as a sovereign to do as it pleases with them, but holds them in trust for the use of the citizen and for no other purpose. Then by what right does it propose to tax us for that use? Other states are not so taxed. The consumer pays this tax in the end. Is a free government as safe resting on indirect taxation for its support as on direct taxation?

In the proposed legislation the Secretary of the Interior is given power to determine to whom he shall lease such power sites, on what terms, how long, how much power shall be used by any one consumer, the rate per horsepower, how much capital should be invested, etc., etc. In other words, he is given direction over our industrial life and be three thousand miles away and with little, if any, knowledge of our needs or the conditions surrounding such needs. Such paternalism is not permissible under our form of government. I have ever believed that the strength of our nation must ever rest on the strength of its citizenship in initiative and productive capacity; a respect for law, because he understands it. To this end the resources in our public domain should pass to the citizen and his control as rapidly as possible, consistent with such regulated restrictions as to quantity; and in relation to such minerals as gas and oil, such restrictions as to method of discovery and working as may be healthful.

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The question of monopoly necessarily arises in considering these questions. Many uses of electricity, such as the telegraph, telephone, light, heat, etc., are what might be deemed natural monopolies. Like all other public uses, such use should be regulated, not by a man thousands of miles away, but by laws enacted by those who are familiar and in sympathy with local state needs. Every state should stand equal before the law in this respect, just as every citizen should have an equal opportunity under the law. Private monopoly is bad enough, but such a public monopoly is infinitely worse under our form of government. We have in Idaho not millions but billions of tons of phosphate rock easily accessible which many forms of industry need. Should they be thrown open to private development under reasonable legislative restrictions, or should the Federal government dispose of them under a leasing system profitable to the government, and thereby direct and control one of the greatest industries in the State of Idaho?

This touches the rights of the states. The method of acquiring title to public land should be simple and prompt, if that is to be the policy in the future as in the past of disposing of our public lands. The proposed legislation seeks to depart from that policy and adopt the policy of governmental leasing of public lands. This opens up a great field for many public officials.

The following appears in "The Call" for this session of the Congress:

Whether the Federal Government shall lease the coal, oil and phosphate lands and water powers, or whether these shall pass into private ownership and subject to the State taxing power, is a question of vital importance to the West.

As an illustration: The coal reserves of the State of Wyoming are estimated at 424,085,000,000 tons. Let us suppose that 25 per cent of this estimate is available for production. A royalty of 2 cents per ton to the Federal Government would amount to two billion dollars. If 10 per cent of the estimated coal were to be placed on the market during the next hundred years, it would mean at 2 cents per ton royalty, eight hundred million dollars—or eight million dollars annually, to be derived by the Federal Government from Wyoming, while Pennsylvania and the other great coal-producing States of the East would go entirely free from paying similar tribute.

Ten per cent of the estimated coal reserve of the States of Wyoming, Montana, Colorado and Utah, at 2 cents per ton royalty, would net the Federal Government twenty-five hundred million dollars—one-third more than the aggregate bonded indebtedness of all the States and cities of the United States.

The water powers of the West are more valuable than its coal reserves, and a most modest royalty will net a fabulous income all of which will be a special tax upon the western States for the support of the National Government, not imposed on the eastern States.

This is one of the least important reasons why the West protests against the proposed leasing and water power bills.

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The question is one which has direct bearing upon mining development and operation, and should receive the serious consideration of the convention.

There can be no legal question as to the ownership of the water flowing in the natural streams of the state by the state. If a state gives the citizen the right to make a beneficial use of that water, by what legal right can the Federal Government deprive such citizen of that use? It seems fair to assume as a legal proposition that the people of the public land states have the right to direct the application of the waters of such states to a beneficial use (navigation excepted). This gives them the right to enact and enforce such legislation in relation to such use as may be adapted thereto. These local people are the best fitted to base such legislation on the needs of such use and best qualified to interpret such legislation in the light of conditions to which such legislation is intended to apply. By what legal principle does the Federal Government propose to take this right from them? These local people, if they are worthy citizens of this great nation, are capable of directing their internal affairs including intra-state public service monopolies. History reveals that absentee landlordism has cursed every community wherever established. I feel impressed that a development of public utilities, based on local resources, by a Federal leasing system is wrong in spirit and will tend to centralization in those not conversant or in sympathy with local needs—the worst form of monopoly. Looking at such legislation in the light above suggested, it seems to me that it is pernicious.

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The Need of Better Mining Education.

BY CHARLES F. WILLIS,

TUCSON, ARIZ.

In the preparation of a paper on the needs and methods of improvement in mining education, it was found that the field was an exceedingly large one to cover. Consequently this paper has developed into an effort to sum up what part of the field in mining education has already been cultivated, whether that field has been sufficiently cultivated and is producing results, and in what part of the field there lies the greatest harvest for the future.

It seems to be a general conviction that education which does not help towards efficiency in life work, although it administers breadth of view, is a luxury intended only for a few. When such is the judgment of the majority, it is time that we considered making the system one for all. There should be less of the old idea of the three R's for all, with high culture for the wealthy, and more attention to the systematic instruction of the industrial unit, the man, and making him as efficient as possible as a man, as a citizen and as an industrial producer.

Why Changes Are Needed.

A few years ago the mining engineer was merely the theorist, who was called in consultation, but today he is called upon to do that which he advises. Mining engineering of the present day is marked with the dominance of the commercial over the technical. The work of modern engineering has resulted in the development of enormous industries, which require a degree of skill, intelligence and knowledge and a high order of executive ability, which was not in demand a few years ago. While the demand for trained leaders has increased, the demand for trained workers has more rapidly increased, but in the meantime, mining education has changed but little. In turning over the pages of the catalogues of the various mining schools of the past ten years, we see a remarkably small difference in the courses offered. Present economic conditions demand more than we have been giving; they demand new types of schools which will have the same general motives except that their specific aim must be to benefit the industry by training workmen. We are

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paying more attention to the commanding generals and to the chiefs of the staff of our industrial system, and unless we pay corresponding attention to the proper technical training of our captains, lieutenants, corporals and even privates, this same industrial system will fail in its full development, for any army must have well trained privates and corporals if the efforts of its commissioned officers are to be most efficiently carried out.

Insofar as the mining college graduates men who are destined to enter the field of mining, the school and the operator stand in the relation of producer and consumer. As the producer studies the taste and needs of the individual consumer, so the mining school may very properly strive to furnish as one of its products men effectively equipped to meet the specific requirements of the operator. The operator is ever on the watch for the technically trained men possessed of commercial instincts, a factor overlooked by the average mining school. The tendency has been to increase specialization in under-graduate courses, to make specialists rather than engineers, tradesmen rather than professional men, men who are trained but not educated, and to decrease the amount of time devoted to the cultural subjects and even to the pure sciences.

Mining conditions have increased so rapidly that it has greatly increased the need for some technical training for all of those who enter the industry. These changes need a new kind of labor which has the requisite adaptability to adjust itself to the changing conditions. While we have been turning to specialization, we have failed to train men for specialization in generalities.

The very character of mining labor has changed. The itinerant, self-reliant miner, jack-of-all-trades and master of several, is an interesting, but now obsolete type. The new type of miner is not so intelligent, but he is more obedient and industrious.

We have all heard the discussion as to what becomes of our mining graduates. Probably less than 50 per cent have remained in the industry. There are several reasons for this; physical inability to do the work, failure to know what they were undertaking, lack of proper training to fit them for a specific niche in the industry and too high specialization with the inability to fill positions in any other line. It is undoubtedly true that there is a large number of technically trained men out of employment, and it is largely because they have not been taught to fill any positions but at the top of the ladder. There is always room at the top for the right man, but there should be no delusions as to the severity of the competition in

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getting there. There is too much ignorance on the part of students concerning what is required of them in the profession. Nearly all graduates go direct from school into the employment of some company. They expect an initial salary commensurate with their education, rather than with their ability. At present the majority go into the drafting room or assay office, partly because of the attractiveness of the work, but chiefly because their school training gives them a greater initial earning capacity as draftsmen or assayers than they could secure in any other department. But they are needed in the mines as badly as in the drafting room, and they should have the training necessary to equip them for such work. There is a great difference between the education that has been given them and the things they should know before their abilities will be marketable at an attractive price.

Years ago the industry demanded practical men. Now it demands technically educated men for nearly every line wherein there lies responsibility. The industry demands men who are fitted first as engineers, not civil, mechanical, electrical or mining engineers, but just engineers.

The first step in a comprehensive plan of education must be to educate the public. If the general public realized the actual conditions under which mining is conducted, the laws would be promptly changed. If the fact that mining involves redemption of capital were properly appreciated, tax laws would be better framed. If the public understood the risks and rewards in mining, there would be less money wasted and dishonestly appropriated.

Then, we must educate the prospector. When the prospector has learned how to develop his property, we will get it in better shape for examination; when we have taught him something about valuation and the hopelessness of capitalizing optimism, we will have more transfers of mining property, and when he knows better how to describe his prospect we will have more incentive for examinations.

The present system fails to educate men for the middle rounds of the ladder, the shift bosses, draftsmen, skilled mechanics, etc. At the present time these positions are held either by men who have had only practical training, which, unless supplemented by study, must be narrow and without scientific basis, or else by men who have had a full engineering course, a training that is more extensive and costly than is needed for the work in view; there is no half way offered.

We must develop the practical as well as the theoretical side of

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mining. Every scholastically trained man at first objects to the practical system for the simple reason that it is not the way he was trained. It is astonishing to find how hard it is to overcome the bias of tradition; college graduates have a peculiar reverence for the customs and forms of their college days for the reason that they were in college at an impressionable age. Consequently any plan which tends to change radically the way things were done when they were in college meets with opposition, which is based upon sentiment rather than logic.

So far this paper has been concerned with men who have had little or no chance to undertake a technical education as exemplified by our present day technical schools. But even in these technical schools deficiencies are evident. The men in practice have found that the mining graduate is more often deficient in the fundamental principles than in the minute details of his work.

Teaching for leadership requires more than that now given in our technical schools. Some of the colleges in the east are getting the breadth of knowledge required for leadership by requiring an A. B. degree before the technical mining training. This method assumes that the man has engineering ability and therefore takes the training for leadership first. This is putting the cart before the horse, for it gives the man the training for the top of the ladder before he has learned how to manipulate the bottom rounds. Methods of teaching should be in the order of the development of the brain functions and apperceptive powers, so that the experience stimulates the desire and effort. Then men may often be found who could pass all the A. B. requirements, and yet would never make good engineers. While the reverse may also be true, still such men with technical ability, although few administrative powers, will always find their place in the industry. Again it is not practicable to require an A. B. degree before technical training for the reason that few young men have either the financial means or the time at their disposal which they may properly spend for such preparation. Conditions over which they have no control make it necessary for them to get started in their life work before they have reached the age of 24 or 25 years. Probably 95 per cent of our young men in technical schools know that they are going to school this year and hope that they are next, while the third year is still in the distant future to be developed. While I do not wish to be understood as deprecating the value of culture, it is believed that the order of training should be in the same order as the development of the individual, had he entered

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the industry with no training and developed himself for leadership.

The variety of work that confronts the engineer of today is so great that more and more restricted specialization has been the inevitable result, and in the effort to meet this demand, over specialization has ensued. The pendulum is now beginning to swing the other way and in an increasingly large number of instances the decision as to the choice of the branch of mining is left to a later date, with the idea of giving the student a greater maturity of judgment and a broader training in the fundamentals of general education.

The Arizona plan was not devised with the idea of turning out finished products; no school can turn out accomplished engineers in the sense in which a finished product leaves a factory. Throughout his life man is in the process of development, or, if he is not watchful, of decay. The college can but start him right in the methods of thinking and doing, give him a clear understanding of the path of his profession and the possibilities in it and guide his steps with encouragement and advice.

The Arizona Plan.

After a study of the needs of the industry, of the conditions under which a school may work, as limited by its finances, its geographical situation and other factors, and a study of the deficiencies as seen by the operations of our technical schools, the Arizona plan was devised, parts of which have already been adopted by the Arizona College of Mines, while the remainder is now under consideration. It contains nothing new, only new in its application to mining, but does involve a very complete rearrangement of ideas. Necessarily the work must be divided into two parts, the non-resident and the resident, with a bridge between them, allowing for a ready transfer in case the student so desired. The non-resident work includes extension work for the public, correlated lecture and correspondence work, short course and trade education, and technical and graduate work. In each of these departments the Arizona plan has something to offer.

Non-Resident Work.

The extension department offers its services to citizens of the state as an information bureau. Inquiries upon matters affecting public or private interest are answered through this medium by specialists who also may be sent, upon request, to inspect conditions and advise as to the procedure. Great care is taken not to encroach upon the field of the consulting engineer.

There will be printed lectures for free distribution on the gen-

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eral subjects of mining, the importance of the industry, the necessity of protective legislation, safety and welfare, and many other subjects of interest to the general public. Extension lecturers will travel about the state, giving a series of talks, to what might be called "mining institutes," composed of men particularly interested. In the past any innovation which we have had in this line, as for instance in efficiency and safety, has been met with ridicule by the workmen, but it is thought that this will cease when the men are shown the importance of that work and their part in it.

Going farther into the non-resident work, we come to the correspondence work. Unless other opportunities for acquiring technical knowledge become practically universal, it is very clear that the field of the correspondence school will find a great work to do. The fact that a single one of these schools has now over 200,000 students enrolled is the best proof in the world of the great demand. With a willing student, a very satisfactory substitute for school training may be obtained.

There is a well defined field for state correspondence schools. There are many young men who have had training in grammar, and perhaps high schools, but gain no other technical knowledge for lack of preparation or for financial reasons. There are many more that are forced to end their careers at the end of the sophomore or junior years. With state correspondence schools would it not be feasible to prepare these young men to enter the sophomore or even the junior year? While there is much doubt about the practicability of giving courses leading to a degree by correspondence methods, a considerable doubt about making a mining engineer by non-resident methods, there is undoubtedly a large field for teaching the individual subjects that will allow a man to better himself in his work, whether he be from the common school, high or even technical schools.

By the Arizona plan the instructors that are doing the extension work are at the same time the personal advisers of the subscribers to these courses, thus giving them the benefit of personal contact. These men will make it a point to visit the students, and to assist them in their work, to inspire them to better work and particularly to help them over the early stages when many students lose their interest because they cannot quite see its practicability in the subjects which they are taking. The ordinary correspondence schools are seriously handicapped by the fact that they do not offer any laboratory work, but this problem is solved by the Arizona plan by having

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the university laboratories open to them for certain periods of the year.

A number of correspondence students in any of the comparatively few centers of population in the state would make possible class instruction, the work to be carried on by the extension lecturers. The personal adviser system of teaching allows the adviser to go down among the workers and find out what is actually needed to make them more efficient, and the methods of teaching are adapted to the people taught. In a word, the university shall fare forth, knock at the doors of the people, and offer them, not a hide-bound curriculum, but exactly what they want.

Resident Work.

Next in the development of the Arizona plan is the short course and trade education. One great need for the short course and trade education is the moral one. The worker needs social recognition through educational activities of a special sort, which is worth while. The lack of education points out to the industrial worker that he is engaged in a life work which is not worthy of being dignified by education. It assumes that while it is necessary that the men who train, execute and administer should be trained, it is unnecessary to train and educate the men who do the work.

Trade courses are not new. For many years colleges have given them, but in a different way. The majority of short courses attempt to teach in two to three months an abbreviated four years' course; this stimulates the student for greater education, which is, of course, desirable, but other than the benefit which such courses have been to the prospector they fail in their object of bettering the trade.

The Arizona plan presupposes requirements for certain courses either by reason of experience, education or correspondence. Intensive work is given on one subject for two weeks, which subject is a small unit of the mining industry. The year is divided into 15 two-week periods, and 15 courses are given, each one complete in itself, and yet related to the one preceding and following it. The whole year makes an admirable trade course. Any portion of the year consists of specialization for special needs. The student may enter at any time and stay two, four, six or any number of weeks. The subjects given are in consecutive order, 1, elementary mineralogy and blow-pipe analysis; 2, elementary geology and petrology; 3, principles of surveying; 4, field geology; 5, fire assaying; 6, cyanidation and the metallurgy of gold and silver; 7, concentration and flotation; 8, mine blacksmithing; 9, mine timbering; 10, practical

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mining; 11, underground machinery; 12, electricity applied to mining; 13, mechanics applied to mining; 14, gas engines; 15, mine management. The division is such that the student interested in prospecting should take courses 1 to 4, inclusive; course 5 may stand alone, may go with the first four courses or may be taken with cyanidation and concentration. One interested in underground work would find courses 8 to 11 the most adaptable, and so on. With each subject the necessary mathematics relating to that subject will be given, as well as the fundamentals of physics and chemistry and the other applied and natural sciences as are necessary for the thorough understanding of that work. The courses are thoroughly practical, designed for practical men.

The present four years course remains substantially as at present in regard to the fundamentals, physics, chemistry and mathematics, but the Arizona plan involves several changes in the rest of the system. Courses are arranged in such a way that the student is furnished early in the course the necessary work to make him proficient to obtain and hold some position in the industry. Under the present four years course the student does not begin to study mining until the third or fourth year. Up to that time he is largely taken up with the fundamentals. The course as now given is really divided into two periods of two years, the first two years being taken up with the fundamentals and the last two with the so-called professional work. Hence many students lack the inspiration during the earlier parts of their course and fail to see where some of the things that are taught are adaptable to their needs. Many become discouraged before completing their work and leave school only to find that they are no better fitted for a place in the industry than they were when they left high school. The present four years course gives little opportunity for the observation of a large variety of practice, and much time is given to practical details which could be learned in a much shorter time in practice. These practical details are often given at the sacrifice of a thorough technical grounding, and invariably cultural subjects are omitted.

By the Arizona plan three summers of practical work would be required, the first in underground, the second in mill and the third in smelter work. It may be argued that this hard physical work will eliminate some students; undoubtedly it will, but it will be the early elimination of those who are physically unfit for mining work before the state has spent hundreds of dollars upon their education and before they have spent years of their time to find later

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that they were unfitted for the work. It will steer them towards the work for which they will find themselves better qualified. Through cooperative work with the mining companies, the University will place these men in positions where their summer work may be supervised by the university officials, who would hold classes at the mining camps during the summer. The students will be educated to observe and will see more and will get more out of their work than they would otherwise do.

Under the present course many hours are spent in laboratories for the teaching of ore dressing, cyaniding, smelting and practical mining, and often with machinery that has long been obsolete. Why not teach practical mining at successful mining camps? Would it not be better to teach milling at successful mills and smelting at modern reduction plants; supplemented, of course, by the necessary class work in the theory and underlying principles? Much time would be saved and a bigger variety of better practice would be given. Under the Arizona plan the senior year has scheduled 35 regular observation and study trips, while the three lower classes will have them at less frequent intervals. Class work covering the theoretical work will be taken up on Monday, Tuesday and Wednesday of each week, and from Thursday to Monday the students are in the field. Cyaniding will be studied at Pearce, Tombstone and Wickenburg; concentration will be studied at Hayden, Globe, Miami, Inspiration and Ajo; mining methods at Ray, Bisbee, Globe, Miami and Ajo, and smelting at Douglas, Hayden and Globe. Geology may be studied at hundreds of places within easy reach of Tucson. By this method the students will avoid a large amount of detailed laboratory work, which, at its best, is an inefficient substitute for actual practice. The student will get the benefit of a large variety of practice; he will live in the atmosphere of the industry, will be subject to the discipline of the working man rather than the freer life of the college, will gain the acquaintance of the men in the industry and will be able to know, upon graduation, what branch he desires to follow. While on these trips the students will be distributed with the men in actual practice; for instance, one student will stay with the shift boss all day, another with the timber gang, another with the drilling crew, and so on, changing at each shift so that they will observe a variety of work. The practical side of engineering can be learned only in the mine, mill or smelter, under commercial conditions, and the theory underlying, in a good college

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under efficient instructors, but the practice and theory should be given simultaneously.

Besides the observation and study trips, regular work will be done at a mine situated near Tucson, which has been loaned to the university. This mine is fully equipped and has extensive workings, a large mill and necessary shops.

The most difficult problem of engineering education today is how to give the student wider culture, and how to provide him with opportunities for the development of those higher social qualities that make for leadership. To the average student there must be a dollars and cents value in every subject, but they should be taught that their college course is but the training necessary to enable them to begin to study engineering, to inspire them with a desire to become engineers worthy of the name, to teach them that they can all help in the world's engineering work by doing carefully and conscientiously the work entrusted to them. By so doing, the students will not go forth handicapped with the idea that they know it all, but with a willingness to work and a desire to learn that which will give them the best possible start on the way to become engineers.

An engineer, if he has it in him, will become a leader, but reaching the top is becoming more and more difficult. Opportunities are greater than ever before only to the man who can add to a more intensive technical knowledge a wider grasp of industrial affairs and an ability to deal effectively with men. Schools cannot be expected to take the place of natural ability, but only to supplement them under favorable conditions such as furnishing the environment where men can develop broadly for all work of life.

Special attention should be paid to English. Many complaints are heard that our engineering graduates cannot write an intelligible letter. It is not merely sufficient to form correct judgments; there must be a skilled and effective presentation of them in well chosen, fitting English.

By the Arizona plan the cultural work would start in the first years of the technical training, along with the technical and practical work. It is a matter of training men and educating them at the same time. You can train a man better if you will educate him, and you can educate him better if you are also training him. General culture comprises such subjects as better enable a man to receive and enjoy services from society; an ability to enjoy the good and noble things in life is a check on many a misuse of the com-

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pensation received. Again, the man with a broad education is more resourceful in his activities, borrowing and lending his knowledge of laws and his experience, and utilizing the analogies between the various departments of knowledge.

The engineer of the future will also be expected to be familiar with the principles of law which may be encountered during the conception, construction and development of engineering projects. We will endeavor to train them in engineering jurisprudence or that part of law in which the engineer is particularly interested. This develops reasoning power and independent thought and cultivates a respect for the strictly legal clauses in specifications and other engineering documents. It is not expected that the students who pursue a course in engineering jurisprudence will be capable of acting as legal advisers, but they will be able to steer clear of the many pitfalls and will be better able to seek legal advice.

We will endeavor to teach them about men, the most important, difficult and expensive tools an engineer uses. While engineering knowledge is absolutely essential to the success of an engineer, he acquires and uses his knowledge through other men. We teach the student how to test materials and how to use them, but we fail to teach about men. It may be argued that each man must learn himself by experience to understand other men, but there are certain teachable principles to be followed. This course will include biography, ethics of the profession and organization; biography to furnish illustrations of the principles concerned; ethics, because it deals with the relations to the men with whom he will be brought in contact, and organization, because its purpose is to use men effectively. It is not expected that such a course will make the student a master of men upon his graduation any more than we expect a doctor to be an expert when he is graduated, but it will broaden his horizon and will make his thoughts deeper, and will also tend to make him pay more attention to the men around him. A man who really understands other men will understand himself, and one who develops the best that is in the men around him will usually develop the best that is in himself.

The Arizona plan includes philosophy, a knowledge of which is essential to success in life, not merely financial or professional success—these are both desirable, but only as means to one end, to live. Philosophy teaches the basic principles of life. One may say that the knowledge of life can only be gained by experience, but it would be just as true to say the same of engineering. If it is necessary

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to educate for the duties of a profession, it is equally necessary to educate for the duties of life. To live completely, we must put ourselves in touch with the world and not in one small aspect of it. The specialist is valuable insofar as he knows more than anyone else about some one subject, but he gains little self-expression and his individuality has little scope. If everyone specialized, where would be the common meeting ground? Science consists in the organization of experience in such a way that we may find therein a guide to our behavior towards nature. The practical philosophy is then required to show us how we ought to conduct ourselves so that our behavior and the behavior of nature shall not conflict. Science gives philosophy its subject, and philosophy criticizes the material thus furnished in the light of the relations of fact and knowledge. Philosophy is the yeast that aids us to properly assimilate and digest the data of science and make it valuable for practical development.

Briefly the broadening influences under the Arizona plan include intensively cultural subjects, directly applied to the needs of the profession. English, engineering jurisprudence, business education, psychology and philosophy are among the subjects considered proper for the training of administrators.

The graduate technical work to be carried on would be research and investigation rather than practice in details of operation. Research goes well along the line of equipping the brain for original work and it is to be done with a view to broad training rather than specialization.

Inasmuch as mining is the principle industry in the State of Arizona and that over 25 per cent of the adult males are engaged in this industry, it behooves the state to supply training for these men. Arizona can do this well. Its well equipped university offers the place, the geographical situation of which is not to be surpassed by any school in the country. Hence our ability to put in vogue the Arizona plan, calling for correspondence education, with laboratory work and personal advisers, correlated extension work, short courses and trade education on a new plan, technical school work with a variety of observation at successful plants, practical mining at a fully equipped mine and the scientific and cultural training given simultaneously. While we are distinctly conscious of the limitations and responsibilities such a plan imposes on those who undertake it, emphasis should be laid on its possibilities. Serious obstacles would undoubtedly be encountered, but we believe it is

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an educational experiment worth trying. We believe it is worth while to expand our plan of education to take care of the vast horde of individuals who do not now share its advantages beyond the most elementary stages. It would show, if wisely administered, that efficiency in education and efficiency in training can go together.

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The Development of Mine Taxation in Arizona.

G. H. DOWELL,

BISBEE, ARIZONA.

Mr. President and Members of the American Mining Congress:

The paper I have prepared gives a brief history of mine taxation in Arizona. Industrial development along all lines during the past fifteen years in Arizona has been little short of marvelous, and the mining industry has kept pace with the others. Concurrent with this progress came the demand for, and the achievement of, statehood with its expensive official machinery to be installed, set in motion and maintained. An important part of this machinery is the state tax commission of three members, one of whom is elected every two years for a term of six years. This Commission is given full power to supervise the system of taxation in the State, and to sit as a board of equalization in judgment upon its own acts.

With the birth of the Commission a little more than three years ago, the old order of haphazard valuation for taxation in the state passed away, and a new order of things was inaugurated whereby all property was to be assessed at its full cash value. The Commission has made splendid progress in perfecting uniform methods of assessment throughout the state. It has erred, however, in refusing to recognize the fact that producing mines cannot be valued as other property is valued; that any official who is ignorant of the mining business or who has but a very limited knowledge of the business, though he be clothed with ever so much authority, can assess a producing mine at its actual cash value. I say the Commission has erred in not recognizing this fact. Successful candidates for this important office have not been slow, however, to recognize the fact that about ninety per cent of the mineral wealth of the state is produced by less than a dozen companies, and the slogan "soak the mines" has been a sure vote getter. In the attempt to place all property in the state on a full cash basis for assessment, mining property was valued this year 7¼ times what it was in 1911, while all other property was assessed at 2.2 times its valuation in 1911. This is the real reason why the Commission has so strenuously opposed a fair and equitable mine tax law, which would limit their

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power to "soak the mines" for political effect. And it is, on the other hand, the principal reason why mining men want such a law. As matters stand now, the valuation of producing mines is entirely in the hands of the Tax Commission. In the light of past experience, therefore, mining men have reason to fear a further increase in the tax burden.

In view of the present undesirable condition of affairs, the question naturally arises "What is the remedy?" I would suggest two general lines of action.

(a) There is an educational work that should be done. The people of our state do not realize the vital relation between their own prosperity and that of the mining industry. This educational work should be done through the medium of the Arizona Chapter of the American Mining Congress. A sentiment for co-operation between the various industries of the state must be created to replace the attitude of antagonism and suspicion that has been so successfully fomented in the past by cheap politicians. I am glad to say that something has been done in the past year to bring about this spirit of co-operation, and the action recently taken by the leading mine owners of the state whereby their employes will share in a small measure their adversities, and in a much larger measure their prosperity, has done much to bring to the employes a realization that their interests are mutual.

(b) The mining men should take a more active part in the political affairs of the state. We must confess that our interest in this direction in the past has been spasmodic or entirely lacking. Right now there is a sentiment crystallizing in Arizona among the business men of every calling and political faith that the state must be run on a business basis by business men, and that the reckless extravagance of the past few years must stop. Now is the opportune time for mining men to join hands with all other business men of the state in making this sentiment effective by nominating and electing to office men of known qualifications.

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Workmen's Compensation Insurance and the Coal Mining Industry.

HERBERT M. WILSON,

PITTSBURGH, PA.

The coal mining industry has suffered in recent years more than any other the vicissitudes of governmental regulation, state, federal and industrial. It has been long believed by thoughtful students of the conditions that the time has come when the price of coal should be placed at such a figure as will not only pay the cost of production, but will also earn reasonable interest on the investment. Not the least advocate of concerted action by the mine owners to this end was the late Director of the Bureau of Mines, Joseph A. Holmes.

Americans are notoriously a wasteful people and this charge lies against the coal mining industry with as great force as against any other, not only as concerns waste of natural resources, but also as concerns waste of human resources. It is to the credit of our generation that, though tardily, we have entered vigorously upon the correction of these evils. It is to the credit of the coal mining industry that it has led in this new propaganda for safety and that no other industry can point to a more vigorous and progressive attitude among the employers than can the mining industry.

State and Federal legislation has been adopted with a view to putting into practical effect the measures deemed necessary for the safety and the welfare of the mine worker with the result that there has been created a condition to meet which adequately in the beginning will at least involve an expenditure which will more than absorb any profits computed on present tonnage prices of coal at the mine.

The last, but in its potential effect by no means the least, of these regulative measures is workmen's compensation legislation and the unknown and excessive burdens which it imposes on the mine operator. There is no doubt that in some states such legislation has gone beyond the limits of all present reasonable requirements and that in these states at least a readjustment in prices or legislative restrictions must be immediately effected.

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We have in the past felt that the settlement of a modest damage suit was adequate compensation to the injured and some have flattered themselves in the belief that they have been generous in dispensing such charity. There was a time even within our generation when the life of a horse or the value of a few sacks of grain were rated higher than human life. More recently, shyster lawyers and corporation attorneys have thriven on the gamble as to what proportion of a meager liability suit should be divided between them and the injured. It was this condition which in the enactment of workmen's compensation legislation has in some cases caused the pendulum to swing to the other extreme. Even the legislators appear to have realized the tremendous burdens they were placing on industry since in many cases they have enacted supplemental legislation providing for state insurance for the employers.

The great stock insurance companies were, through their wide experience and the vast fund of statistical data in their possession, prompt to realize the extremity in which the coal mining industry in particular has been placed because of the large indeterminate factor of catastrophe or mine disaster hazard. It was at once evident to the casualty insurance companies that there would be serious public reflection upon them were they to underwrite the less hazardous industries in any compensation state, thus skimming as it were, the cream off the milk, leaving the more hazardous business, that of the coal mining industry, until the last. They felt it to be an obligation as well as a part of wisdom to seek the good will of the public by accepting coal mining business along with other industrial risks, regardless of the fact that no one company felt that it could accept catastrophe hazards, and to the further fact that they doubted their individual ability to offer reasonable premium rates with any assurance of earning profits.

Accordingly The Associated Companies was recently organized by the following ten strongest and best known casualty companies in the United States and Great Britain, viz.: The Aetna Accident and Liability Company, Hartford, Conn.; Aetna Life Insurance Company, Hartford, Conn.; The Employers' Liability Assurance Corporation, Ltd., of London, England, U. S. Branch, Boston, Mass.; Hartford Accident and Indemnity Company, of Hartford, Conn.; London Guarantee and Accident Company, Ltd., of London, England, U. S. Branch, Chicago, Ill.; Maryland Casualty Company, Baltimore, Md.; The Ocean Accident and Guarantee Corporation, Ltd., of London, England, U. S. Branch, New York, N. Y.; The

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Standard Accident Insurance Company of Detroit, Michigan, Detroit, Mich.; The Travelers Indemnity Company, Hartford, Conn.; The Travelers Insurance Company, Hartford, Conn.

As managers of dividend paying mines you are undoubtedly interested in any plan which will reduce the unknown obligations of the distant future to a fixed present cost, thereby materially simplifying your financial and accounting burdens. In the transaction of this business you are constantly facing the probability of unknown losses, not least of these has been your unknown obligations under employers' liability legislation. The rare, but nevertheless menacing catastrophe liability is one against which none of you could make provision without insurance protection. You would be bankrupt were you compelled to pay the compensation to the workmen obligated by the law, should you lose the lives of 50 or 100 or more miners by a serious disaster.

Even the state insurance bureaus established in connection with Workmen's Compensation legislation are not, as evidenced in the case of West Virginia, strong enough to safely face this hazard under the imposition of premium rates which you would deem reasonable. This is due in a large measure to the fact that such bureaus operate only within the confines of one state, whereas a stock insurance company may have business in every state.

The mutual insurance companies are similarly unprepared and cannot safely enter this field of insurance, and were any mutual company or association of mutual companies strong enough to underwrite casualties in your mines, you would still be burdened with this item as an unknown liability, and one therefore detrimental to the financing of your business, for the reason that mutual companies have no capital and no surplus or reserves, but may make any number of assessments upon you according to the requirements.

Probably the most difficult and expensive problem to be faced should you attempt self-insurance is that of following up the injured in their wanderings, in so-called total disability cases. These total disabilities, or so-called permanently injured, are three times as numerous as the fatalities and in many states, for example Pennsylvania where compensation must be paid for five hundred weeks, or nearly ten years, how are you to know that the injured, who has recovered sufficiently to roam from Pennsylvania to Colorado, or Washington, may not have long ago recovered and be earning wage while you must continue to mail him his monthly indemnity? Nor are state insurance bureaus able to follow the wanderer beyond

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their borders, while the range of activity of the mutual company is equally limited. The ten stock companies composing The Associated Companies have each their agencies in every portion of every state and for this one item alone they will be able to reduce their expenses so greatly compared with the others as to enable them to figure a much lower premium rate than they can. Again, and because the total assets of The Associated Companies exceed $250,000,000 and its business is distributed throughout all of the states of the United States, they are able to compute in the beginning, a fixed price at which a risk will be carried for a stated period of time, thus rendering your obligation certain and definite and enabling you to figure in advance the effect of this charge on the price per ton of coal production. This as self-insurers you could not do nor under the mutual system with its assessments and the possible danger of insolvency as a result of catastrophe.

For its own protection as well as for yours the first act of The Associated Companies was to organize a Department of Inspection and Safety which it is its intention shall lead in scientific and practical methods for protection against mine accidents and for their prevention. The efforts of that Department will be largely directed toward aiding the insured to increase the conditions of safety and security in their coal mining operations by putting at their service not only a new and independent inspection force, but by being prepared to furnish free consulting advice as to the best methods which may be adopted to this end.

The plan of the association is to formulate a basis rate for each state, this rate being dependent upon the severity and frequency of accidents in that state, and the application of the law of that particular state thereto. It is proposed that the basis rate shall be an average rate, on the theory that if every mine in the state were insured at that rate it would just pay the losses and expenses without any profit to the association other than from banking. The association proposes to load its coal mine rate with an overhead charge for expenses lower than has ever before been known in the insurance business in this or any other country, in order that it may carry out, insofar as in them may lie, their humanitarian purpose of increasing the conditions for safety in mining.

It is felt that the coal mining industry is above all others a newer and more fruitful field in which to test the advantages to the insurance business of strenuously advocating safety measures and

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paying premiums therefor, thereby greatly aiding in the safety movement. In order to do this they realize that it is essential that they fix premium rates for safe practices so low as to encourage the extension of their activities into every mine in every state, thereby increasing safety in many mines where safe measures are practiced only in the breach.

The association proposes to do this by determining an average rate for which they can theoretically underwrite every coal mine in a given state, and then to recognize that some coal mines should pay a higher rate and some a lower rate because of favorable and unfavorable conditions of the mine and its equipment as well as the circumstances or organization under which the mining operations are conducted. This brings them to the more difficult purpose known as schedule rating, a system by means of which the average rate for a state is increased or reduced depending upon the merits or demerits of the risk from a physical and moral standpoint. In this plan a proper rate will be assessed against each individual mine rather than charging all the mines alike, and the effect will be to offer some inducement to improve conditions of safety and sanitation and for a higher moral plane of operation.

It is proposed, so far as is humanly possible, to produce a separate rate for each individual mine consistent with their respective risks and the safety measures adopted in each mine, and then to put those mines under the observation of skilled inspectors from the safety standpoint, with a view to improvement. If in time it is found that the average of all rates in a given state is lower than the average fixed for that state, this will mean either that each individual mine is better than the average or has been made better by the inspection methods, and this should result in a reduction of the average insurance rate. When this can be accomplished the association will feel that its efforts have been successful. Necessarily the time for reduction in the rate of insurance follows slowly the improvement which calls them forth, and therein may lie some measure of profit to the insurance association which it cannot in the beginning anticipate.

The Associated Companies proposes to start, as a basis to guide it, with those safety practices, precepts, and rules which the Federal Bureau of Mines has indicated for the protection of mining operations. We ask your aid in developing the best safety standards for each practice in mining for your state or for the various mining districts in your state. Wherefore, I shall be glad to have

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your discussion on this subject before this Congress if appropriate. I especially ask that the Mining Congress appoint a committee on safety standards with which we can confer regarding these matters.

As to the adoption of basic rates, take for example any practice such as digging coal. It would presumably be desirable to adopt for each state or district some average practice concerning safety as a basis for premium rating, say for instance, undercutting the coal and shooting with black powder with a fixed maximum charge; then for any less safe practice as shooting off the solid the premium rate would be higher, and for any more safe practices such as undercutting but shooting with permissible instead of black powder a lower premium rate would be fixed. Similarly a standard should be set for each district as to the number and spacing, method of distribution, etc., of timbers at the face, and any less safe practice than the standard should be penalized, and more safe practices encouraged by fixing higher or lower premium rates than the base rate adopted as standard. Similarly for the safety organization in the mine, the training of men in first aid and mine rescue, etc. It is the belief of The Associated Companies that for those mines adopting the larger number of approved safe practices and measures, a very low premium rate can be offered and that the result will be to give financial encouragement to all mining companies to abandon unsafe and to introduce the most safe practices.

The Associated Companies corresponds to the Fire Underwriters Association, which for fire insurance examines the buildings offered for insurance, fixes the rate of insurance and periodically inspects and re-examines them. As compared with this association, the Federal Bureau of Mines will similarly correspond to the Underwriters Laboratories in Chicago, which latter makes tests of such fire prevention devices as fire windows, doors, hose, automatic sprinklers, etc., the Federal Bureau of Mines at its testing laboratories in Pittsburgh passing upon the relative merits of safety devices in mines, such as the various kinds of explosives and their permissibility, coal cutting machines, safety lamps, electric lamps, etc. The Associated Companies will correspond to the Fire Underwriters Association in the above example, examining in advance the mines offered for insurance, fixing the base rate and also schedule rates for the adoption and use of approved safeguards, devices and methods, and periodically re-inspecting such mines largely with a view to suggesting such improvements in safety measures as may earn a reduction in premium rate.

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The extent of the first obligation which workmen's compensation imposes upon the mine operator is much greater than many of you may realize and because of its magnitude it will doubtless cause the fixing by insurance companies of base rates in your several states which may seem prohibitive. In many cases experience alone must be depended upon to prove to the mine owner that high as such rates may appear to be they are no higher than the law demands or than his self-protection would cost. There is every reason to believe, however, that the merit or schedule reduction from the base rates which will result from inspection will in all deserving cases, those of the reasonably safe mines, be such as to so materially reduce the premium as to meet your reasonable anticipations.

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Compensation Laws Insurance Accident Prevention.

DAVID ROSS,

SPRINGFIELD, ILL.

Any one of the questions suggested in this subject would supply material enough for an entire discourse, but as they are all more or less related I shall, in view of your limited time, attempt a brief consideration of each of them.

The American Mining Congress was the first large organization in this country, in which the employing elements predominate, to declare in favor of the enactment by the federal and state governments of Workmen's Compensation Laws. Several years before we had any state legislation on this question the congress registered its official approval of the principle that every branch of productive industry, none excepted, should be held responsible and as far as possible, make good the financial losses sustained on account of work injuries.

Consistent with this policy it has encouraged the repeal of former liability procedure and to the influence it has been able to bring to bear upon law making bodies may be largely ascribed the significant fact that within the past sixty months three-fifths of our states comprising all the industrial sections have adopted the plan as a part of the public policy of their respective commonwealths.

In all fairness it ought to be said that it was not, and is not, the purpose to impose upon employers as such any undue burdens, but rather to provide a better and more equitable distribution of that portion of the expense incident to all forms of industrial employment.

It is not only the theory but the actual practice to charge against industry every factor entering into the cost of production so that ultimately the consumers pay their fair proportion of every expenditure and risk.

In regard to compensating the families of men killed in the line of their work, or partially rewarding them for time lost because of work accidents, regardless of any question of negligence, an attempt is made not to introduce a new principle, but to give a

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wider extension to an old one, and by including this fuller item in the cost sheet permit the public to make its just contribution.

The placing of a broken man in the same category with a broken machine, figured as an expense factor, may give a jolt to exalted ethical notions, but it yields a larger measure of immediate relief and justice to all parties than is possible under a regime of hate creating litigation.

As a part of fate's inscrutable irony the coal mining members of the Congress have up to this time been unable to take full advantage of the policy they have recommended others to accept, and it is to be regretted that in all states where optional compensation laws are in effect, mine operators, or a great majority of them, have elected to reject such legislation partly, it is stated, on account of increased insurance costs, and this brings me to a consideration of some of the points advanced in the very able address of Mr. Herbert M. Wilson, who, as Director of Inspection and Safety of The Associated Companies, has given us a comprehensive outline of the plans of the new insurance syndicate accompanied by a statement of the reasons for its formation.

The hope expressed by Mr. Wilson for an early improvement in the condition of the coal mining industry is certainly shared by all directly connected with it, and his reference to certain federal legislation which has discouraged and prevented legitimate organization, so far as effect on prices is concerned, is timely and to the point. Considering how essential the mining of coal is to the welfare of the nation and how much we owe to it for our prestige as a manufacturing power, there is no line of public activity that offers so little inducement for the investment of capital.

In an address delivered before a recent session of the Congress, Dr. Parker, at that time statistician for the United States Geological Survey, submitted figures taken from the records of coal corporations showing that in six states the cost of producing coal exceeded the actual income, while in six other states comprising the principal coal producing regions of the country, the margin of profit varied from one to two per cent and that all of the operations in those states would have disclosed a deficit if proper allowance had been made for interest and depreciation. Many of the oldest and most conservatively managed mining properties today are either idle or in the hands of receivers and it is safe to assert that present capacity and equipment are fully 100 per cent in advance of normal market requirements.

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In the face of a situation of this sort aggravated as it is by the fiercest kind of a competitive struggle, it is hardly to be wondered at that any suggestion involving what appears like an increase in the cost of operation for any purpose whatever would excite criticism and opposition. No single industrial interest has suffered so much from the pressure of its own surplus as that of coal mining, nor has any been the victim to such an extent of the misguided wisdom revealed in the so-called Sherman Anti-Trust Law, and its numerous mistaken interpretations.

Bad as conditions are, however, we are not entirely without hope for the future and some nondescript salvation is offered in the form of another congressional act creating a Federal Trades Commission, whose function it might be to paralyze the hand or close the eye of the Sherman act to some technical violation when satisfied that the effects would not be destructive. From this conception of its protentialities it is not improbable that the petition of the coal mine owners of Indiana will be granted and the citizens of that sovereign state permitted to combine—not to increase the selling price of their products as they have made no such request—but to reduce by organized action the expense of present business methods.

Partly in consequence of limited markets and low prices coal mine operators have felt the necessity of economizing in every possible way and when, following the enactment of Workmen's Compensation Laws, they were required by the terms of such acts to insure against their new liabilities, they, or most of them, either elected to operate outside of the law or sought temporarily the relief promised in the prospectus of some Mutual, Reciprocal or State Insurance schemes, or ventured to embark in the insurance business on their own account.

Mr. Wilson's statement of the essential inadequacy of these different and limited forms of insurance is, without condemning any of them, abundantly sustained by experience in recent years. Conclusive also is the explanation he offers for the various rates fixed by casualty companies in accordance with experience and the measure of benefits provided in different compensation laws:

As explained these rates may appear high, but only when compared with those charged under liability for but partial protection. Policies issued under the old plan were limited to five and ten thousand dollars regardless of the number of lives lost resulting from any one accident. Because they were limited in this way it was not real

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insurance and as a matter of fact was intended and used by employers as a means of protection against law suits.

Obligations under Workmen's Compensation Laws which insurance companies assume on the employer's behalf, are of an entirely different nature. Compensation insurance furnishes complete protection to the employer and covers every element of expense connected with every accident from the moment of its occurrence until the recovery or death of the injured. This includes medical, surgical and hospital services; from 50 to 66⅔ per cent of average weekly earnings commencing at the expiration of the first or second week following the injury and continuing until such payments equal the aggregate for death, varying in different states from three to six thousand dollars, and more in cases of total disability, in addition thereto specific amounts for the loss of any member of the body or for any disfigurement to the hands and face, besides liberal sums for funeral expenses. Added to these obligations and to make certain the payment of compensation together with all other expenses the insurance company, in the event of an employer's insolvency, is held responsible.

These are but parts of the expense entailed in the conduct of every business and they are legitimately chargeable to it. This is the policy to which as members of the Congress in endorsing the compensation plan we unreservedly committed ourselves, and the industry that is not prepared to fully meet all of its obligations in this respect proclaims itself in the parasitic class and ought to be abandoned.

The very general enactment of Workmen's Compensation Laws in this country, and the necessity for adequate and solvent insurance which their successful administration requires, make the problem a national one, and only an organization like that proposed by The Associated Companies, backed as it is with a capital of over a quarter of a billion dollars, and what is equally important with the best and most experienced management, is competent to solve it. By including all the mines in the country it will be possible to obtain general average results upon which to charge reasonable insurance rates, and the companies, as indicated by Mr. Wilson, in offering this service to the operators of coal mines practically propose to render it on a cost basis so far as any underwriting profits are concerned.

Two features prominent in the new plan of insurance should appeal strongly to mine owners, first, the application of the schedule

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or merit rating principle to mine risks, and second, the inducement it supplies for effective accident prevention activity. Mines that are rendered extra dangerous partly through the indifference of operators or the unsafe practices of its workmen, should be penalized by increased insurance charges, and, reversely, mines that are made comparatively safe by observing the law and enforcing safety regulations should be encouraged and rewarded in the form of reduced rates. This result has followed the application of the merit rule to other industrial risks and there is no reason why it would not operate as successfully with the greater hazards of coal mining, so that the general adoption of such a policy would mean to increase mining profits at least to the extent that it would reduce mine expenses through diminished accidents.

The difficulties in the way of the success of any restricted plan of coal-mine insurance, as indicated by Mr. Wilson, are the constant catastrophe hazards peculiar heretofore to that kind of employment. It is this which has discouraged even strong stock companies acting separately from the unlimited underwriting of such risks, and explains, even under a limited trial, the impairment of the state fund in West Virginia, the necessity for frequent revision increasing the rates for mining under the Ohio experiment, and the recent failure in Illinois of the Coal Mine Operators' Mutual Insurance Company. From January, 1914, to May of the present year, 476 lives were lost in separate accidents involving from five to one hundred and eighty-one men, the cause in most instances being due to gas explosions. Not so long ago 256 men lost their lives in Illinois in consequence of a mine fire, while just recently 263 men were killed in a mine explosion at Dawson, New Mexico. Unlooked for losses of these magnitudes threaten the solvency of the average separate employing or insuring company, and argue strongly in favor of an association formed for protection and prevention on nation-wide lines.

The purpose of the government in creating the Bureau of Mines was chiefly to conserve human life and considering the manner in which it has been handicapped by lack of sufficient funds, a wonderful start in that way has been made, but the actual work has scarcely begun. There still rests upon our people the fearful indictment that in the operation of coal mines we are killing, even under present improved conditions, nearly three times as many men as the same industry in Europe, and the business there is conducted under conditions normally more dangerous than prevail in the United States.

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What is the reason and explanation for this? Some mining experts have offered the excuse that the frequency of American coal mine accidents is due entirely to the employment of so many unskilled, non-English speaking men. This apology might pass if only that class of people were being injured and killed, but unfortunately the record discloses that the old, experienced English-speaking miners contribute, according to numbers, more than their share of the accidents. As an answer to this it has been urged and with some force that foreign-speaking miners as a class are more responsive to discipline, they will do what they are directed to do, which is not true in the case of too many who speak the English language, and this trait in our American character has helped to delay the progress of the safety movement. Many of our people in their pride imagine they know too much to be told anything. If for instance the mine inspector asks or otherwise indicates to a foreign miner in the interest of his own safety to set a prop in a certain place the chances are he will do so without question. If a like request were addressed to an American miner most likely he would insist on discussing the matter comparing his own knowledge and experience with that of the inspector as to where roof supports should be located.

The reason for our unfavorable mine accident record is to be found in our general disregard for law, supplemented by imperfect supervision, unsafe work practices, and incompetence, combined with carelessness on the part of many employes. Belgium has the deepest and most dangerous mines in the world and presents the lowest fatality rate, its workers, like those in English, French and German mines, know what law and strict enforcement of mine safety regulations mean in those countries, besides they are educated to understand and use the legitimate implements of that craft. It requires but a short apprenticeship in American mines to enable a person to forget, if he ever knew, the function of a pick. In this country anyone knowing enough to turn the crank of a drill can qualify as an American miner.

Last year 2,451 men were killed in or about our coal mines. This means that a dozen dead men were taken out of the mines during the course of every working day, in addition to 100,000 injured. Of these appalling occurrences, it is estimated that fully three-fourths of them were directly due to carelessness, to law violations, and a general indifference to dangers.

Legislative bodies as a rule are responsive and our difficulty

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has not been in a failure to secure enactments so much as in the enforcement of mining and other regulations, and in the observance of safer work methods.

If 75 per cent of coal mine accidents are preventable they should be avoided and they can be avoided if to begin with the management is sincerely interested in insisting upon the adoption of safer working plans, and willing to give substantial evidence of such interest. Heretofore we have been inclined to rely too much on the mere law-making power and not enough on our own initiative to do the things necessary to convince employes that the management is not only in earnest but ready and anxious to co-operate with them along safety lines in a way that will count for something.

This is not theorizing or indulging sentiment as such plans are now in effective operation at several of the larger mining plants in the United States, and the results in accident prevention are such as to indicate what might be expected if like efforts and methods were applied in the case of every coal mine in the land. If the cause of killing and crippling men is due in any respect to a lack of knowledge of the English language that obstacle can be easily removed by the opening of schools in which to teach adult miners to speak the language. This is a part of the educational work that many industrial plants are now successfully prosecuting. If these results be due to the ignorance or carelessness of men while at work, then, as over 50 per cent of all mine accidents are caused by falling coal and rock at the face of the working places, it is possible in a large measure to control a major portion of such accidents by the employment of trained face bosses or inspectors. This is the plan now in effect by many of our up-to-date mining properties and from it, it is claimed, the greatest saving in accident account is effected.

In the class of mines to which reference is here made a regular safety system of organization is maintained, including the appointment of committees from time to time employed at the company's expense whose duty it is to go over and inspect the entire mine and report any dangerous conditions or recommend any changes that would make more safe its operation. Because of frequent changes in the personnel of such inspection committees a spirit of rivalry has been generated among them and special efforts made to determine which is entitled to most credit for suggesting and having adopted safety recommendations. This and other phases of the work like the maintenance of rescue and first aid corps appeals to and interests

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the mine workers and there is no better or more attractive way of getting recruits for the army of safety boosters.

Let us note the effect of these safety plans on the proportion of mine accidents whether figured on the basis of tonnage or men employed. According to statistics compiled by the Bureau of Mines the loss last year for the country was 3.30 for every 1,000 men employed, varying from .87 in Michigan to 7.43 in West Virginia. Illinois is the largest coal producing state with a death rate of less than 2 per 1,000 employed. For the United States there was one fatality for every 208,078, for Illinois 381,860 tons. The Superior Coal Co., operating three mines at Gillespie, Illinois, where every precaution is taken for safety, produced last year 2,534,312 tons with three fatal accidents or an output of 844,771 per death, or a production per fatality of more than four times that for the United States. If this ratio had been maintained throughout the country the total mine death roll instead of 2,541, would have been but 415, or a saving of 2,126 lives, a result certainly worthy of the most strenuous efforts.

This is not an isolated instance as other mine properties under similar safety management are realizing like results and they all serve to impress us with the solemn duty of saving life which is not only the most valuable asset, but counts heavily on the profit side of every productive enterprise.

If limited markets and excessive competition are to prevent any immediate increase in coal mine earnings the plan of national co-operative action, embodied in the proposition of the Associated Companies, promises a material reduction in operating expenses which in turn may prove the entering wedge for a more compact commercial organization making its influence felt on coal prices.

In the great work of classifying and standardizing coal mines for safety the facilities and vast resources of the Federal Bureau of Mines are at your service, and the Congress should avail itself of the opportunity at this session by appointing, as Mr. Wilson requests, a representative committee for that purpose.

In view of the results already realized in other lines of employment, it is reasonable to assert that the adoption and enforcement of uniform safety standards would prevent fully three-fourths of present ordinary mine accidents, including a substantial control of catastrophe hazards created in almost every case by careless, unlawful practices.

It is only within the past few years that the scientific principle

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of merit rating has been applied to industrial risks, and an actual test of its efficiency has demonstrated its value as a life and money saver.

Manager Whitney, of the Workmen's Compensation Bureau, informs us that the schedule system is now in effect in thirteen states, that inspections during the past year have been made on 20,000 plants employing 1,200,000 employes, with a pay roll of $7,000,000, and that since its introduction there has been a reduction in insurance premiums of over $2,000,000.

This, as Mr. Whitney observes, represents a saving of $2,000,000 in lives and limbs measured in terms of compensation benefits, and many times that sum in actual value.

As the total amount charged for insurance protection under this modern method is entirely conditioned upon the insured's ability to keep plants up to or above standard the financial incentive it offers for greater safety places the ultimate expense for such service largely within the control of employers.

This plan of determining the actual cost of insurance is in part the outgrowth of the new obligations created by Workmen's Compensation Laws, and the chief claim in its favor is the direct influence it exerts in the more important consideration of preventing accidents.

The problem so far as mining generally is concerned is admittedly a serious one, but through the active co-operation of mine workers and mine owners, supplemented by a strong national insurance agency, like that represented by The Associated Companies, its practical solution is assured.

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Mining Hazards On the Pacific Coast.

FREDERICK L. HOFFMAN,

NEWARK, NEW JERSEY.

Mr. Chairman and Members of the American Mining Congress:

I have not been able to prepare a paper for this occasion on account of the fact that for the last two months I have been actively engaged more or less in an investigation of mining hazards in the states of California and Nevada. My remarks will, therefore, be rather brief, and limited to essential details of underground and surface conditions affecting miners, and others employed in the Pacific Coast mining industries, with some incidental observations on smelting and refining.

The mining fatality rates on the Pacific Coast are, generally speaking, excessively high. It is safe to maintain that the normal crude fatality rate in metal mining should not exceed 2.5 per 1,000 employed. For the United States as a whole the rate for 1913 (no later statistics being as yet available) was 3.54 per 1,000, which compares with a rate of 4.53 for California and 3.42 for Nevada. Considering underground employes only, the rate for the United States was 4.29, against 5.38 for California, and 3.84 for Nevada, per 1,000 employed. Since it is only for very recent years that data have been available for California, through the Bureau of Mines, it would serve no useful purpose to discuss the question historically, but there are convincing reasons for believing that in former years the fatality rate must have been higher than it is at the present time.

The fatality rate varies more or less according to the metal mined, but my own investigations have thus far only included the gold and quicksilver mines of California and Nevada. I hope, some time in the future, to be able to thoroughly examine into the underground conditions of copper mines, and miscellaneous metals and minerals, which, of course, are of relatively less importance as an accident and insurance problem.

The fatality rate for the gold and miscellaneous metal mines of California for 1913 was 4.42 per 1,000; for Nevada, 2.84; and for the United States as a whole, 3.43. For underground employes

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only, the rate for California was 5.13; for Nevada, 3.86; and for the United States as a whole, 3.9.

For the copper mines of California the fatality rate for 1913 was 5.15 per 1,000; for Nevada, 5.15; and for the United States, 4.20. The relatively high rate for Nevada is probably in part due to the rather exceptional methods of open-cut mining in the Ely district. It, of course, would be erroneous to compare, without a due regard to actual conditions, the fatality rate of such a district with typical underground mining methods in the copper mines of California. This is best explained by the statement that fatal accidents on the surface caused a fatality rate of 2.33 in the copper mines of California, against 6.62 per 1,000 in Nevada. It is rather interesting, however, to note that in the adjoining copper mining district of Utah, at Bingham, where practically the same methods are followed as at Ely, the surface fatality rate was only 2.44 per 1,000. According to a recent report of the United States Bureau of Mines "Nevada and Montana are the only states that show a continuous reduction of fatal accidents during the four years covered by the Bureau reports."

Fatality rates for a single year are not an entirely trustworthy indication, but in a general way the foregoing statistics are sufficient for the purpose of emphasizing the rather excessive prevailing fatality rates in metal mining in California and Nevada, and the high average fatality rate in metal mining throughout the United States.

As a first impression of present-day mining conditions in California and Nevada, I am frank to say that my general conclusions are decidedly favorable. In both states the obtainable evidence is readily convincing that much is being done to improve underground conditions and to bring about a condition of safety in reasonable conformity to modern requirements, strongly influenced, naturally, by the more or less drastic provisions of workmen's compensation laws. The progress which has been made is, however, also in a large measure the result of a broadening conception of mine owners' responsibility, on ethical and economic grounds as separate and distinct from the legal responsibility imposed upon the mineral industry by statutory changes during recent years. There is, unquestionably, a higher regard for the welfare of the men, and in the main it can be said without fear of successful contradiction that the relations of employer and employe in the mining industry were never as satisfactory in the two states referred to as they are at the

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present time. From manager to miner the fundamental principles of the safety-first movement are clearly recognized, not only as a matter of simple justice to mine employes, but also as a matter of sound business in every sense of the term.

Mr. H. M. Wilson, formerly of the Bureau of Mines, in his preceding address enlarged upon the insurance aspects of the mine accident problem, but I am inclined to think that the available data regarding insurance cost and insurance results can not as yet be considered conclusive. The subject has naturally attracted considerable attention and a diversity of opinion prevails as to the best course to be followed. Self-insurance as practiced by a few large mines is obviously out of the question for the large majority of mine owners and managers, who could not possibly hope to provide in their own way for the calamity risk inherent in most mining operations. A mine manager, however, who finds that the annual premium which he is required to pay to the state fund, or the private casualty company, is much in excess of the actual cost of compensation proportionate to pay-roll exposure, must needs reflect upon the question involved as to whether the rates charged are equitable or not. The hope of an ultimate dividend return hardly appeals to most managers, who for the time being are expected to obtain the most satisfactory business results. The actual insurance experience in Nevada and California is extremely suggestive and in itself indicative of a material reduction in present-day mining hazards, although subsequent experience may possibly warrant a modification of this view, The technical aspects of the problem are too involved to permit of an extended consideration, but it may be said that under normal conditions in well managed mines the required premium should not exceed three per cent of the pay-roll, and by painstaking attention to details, and the enforcement of rigid discipline under ground, the actual cost of compensation may, without much difficulty, as shown by actual experience in the case of several important mines in California and Nevada, be reduced to two per cent, and even less. In other words, in a large measure the solution of the problem of insurance cost rests with the mine management, but in return it is of the utmost importance that the state fund, or the insuring companies, should recognize the necessity of merit rating, the first principles of which, as applied to mining, have hardly as yet been successfully evolved.

Mr. Wilson seems to be of the opinion that a standardized merit rating practice would not be feasible for the mining industry, but

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the recently published tentative mine safety rules of the Industrial Accident Commission of the State of California, prepared in co-operation with a committee of mining men, clearly indicate that a consensus of qualified opinion can be had without serious difficulty. There will also shortly be published by the United States Bureau of Mines a code of rules and regulations for metal mines, prepared by a committee consisting of Messrs. W. R. Ingalls, James Douglas, James R. Finlay, J. Parke Channing, and John Hays Hammond, which will provide a thoroughly considered basis for an equitable and common sense system of merit rating. In the perfection of a rating practice the numerous special investigations of the United States Bureau of Mines into the causes and connecting circumstances of mine accidents, and the best practical methods and means for their prevention, require, of course, to be taken into account. I need only refer to the circulars on accidents from falls of rock or ore, accidents from mine cars and locomotives, fires in the Lake Superior iron mines, hints on coal-mine ventilation, and, finally, an exceedingly suggestive primer on explosives for metal mines and quarries, as a promising indication of the ultimate attainment of a widely diffused practical understanding of fundamental principles of safety and sanitation in the American mineral industry. The work being done by the Bureau of Mines, and it requires to be said, in hearty co-operation with mine managers, foremen, etc., challenges favorable comparison with any corresponding effort elsewhere throughout the world.

I have personally visited some twenty of the principal gold and quicksilver mines of California and Nevada. In every case the utmost freedom was extended to me to make myself thoroughly familiar with underground conditions at their worst as well as at their best. If much remains to be done to raise the standard of safety and sanitation it is largely because the fundamental principles of the best practice to follow are as yet but ill-defined or imperfectly understood. There is everywhere a demand for practical and common sense, but authoritative, suggestions, and with few exceptions I met with a sincere and general appreciation of the great practical value of the tentative mine safety rules recently issued by the Industrial Commission of the State of California. I met with no serious reluctance to incur even a considerable amount of expense, on account of safety first requirements, but a natural opposition to ill-considered experiments involving both a risk of life and property loss. In any event, the most objectionable features

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underground have, in many mines, been eliminated, and there are strong reasons for believing that the future fatality and serious injury rates will be materially below the average for recent years.

In detail, of course, there are faults to be found in every mine, but after all there is so much more that is deserving of praise that the shortcomings are of secondary importance. The most objectionable conditions are met with in the smaller mines, where many individual accidents occur which in the aggregate contribute substantially towards the high fatality and serious injury rates common to the metal mines of California and Nevada. A thorough analysis of the actual experience of practically all the larger mines in California and Nevada proves conclusively that the fatality and serious injury rates in these mines are less than for all mines considered in the aggregate. The problem of underground accident prevention is, to a considerable degree, a question of cost, and the smaller and more speculative mines are often not in a position to install the required protective devices, which would be but a minor consideration to the larger and more prosperous mining companies. The question of effective inspection and state control is, therefore, obviously much more a matter of concern to the smaller mines than to the larger and better managed properties.

In my investigations I naturally gave attention only to the essentials of mine safety and sanitation, including, however, the occurrence of occupational diseases. It would carry me too far to discuss the results in detail, and I touch upon the same with some reluctance in view of the rather technical problems involved. Relying, however, in the main upon the required standards as laid down in the tentative mine safety rules of the Industrial Accident Commission of the State of California, I found a comparatively high degree of conformity in all the larger mines visited in California and Nevada. In other words, the ideal aimed at in the tentative mine safety rules is already in a large measure conformed to in most of the mines included within the scope of my personal investigation. There are, however, some very notable exceptions, and some flagrant violations of the first principles of safety and sanitation. It would not be appropriate for me to discuss mines in detail, but I may suggest that it would serve a very useful purpose if the results of the special inspections made by the mining division of the Industrial Accident Commission should, in course of time, be made public. It is difficult, no doubt, to provide entirely safe and satisfactory ladders and ladderways, but there are no reasons why so many bad ladders, with

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broken rungs, or worn out rungs, should be permitted, and why safety platforms should not be provided in exceptional cases where an almost vertical climb of several hundred feet may be necessary. There are some serious faults in individual mines in the hoisting arrangements, and riding on the cages is practiced where it is not necessary and extremely reckless. Some of the cages are run at a speed inconsistent with fundamental safety considerations. Safeguards against overwinding are wanting in some of the mines, and probably in many of the smaller mines. The electrical equipment, in some cases, is crude and dangerous. It would seem advisable to go much further in the electric lighting underground than is actually the case. Some of the landing or station platforms in a number of deep mines are poorly lighted and badly guarded around the ore chutes, with the practical certainty that sooner or later a serious accident will occur. Candles are still used in many mines where acetylene lamps would be distinctly preferable. The ventilation in some mines leaves very much to be desired. The sanitary conditions in others are very primitive and unquestionably directly contributory to the spread of miners' ankylostomiasis. Strictly sanitary drinking water is not provided in all mines, although the means or methods for doing so have been practically established in many of the best managed properties. While the risk of personal contamination may be small, it is a risk which should not be needlessly incurred. The change houses are often far from being as well taken care of as would be desirable. What can be done in this direction without material expense has been well brought out by a number of suggestive contributions to the mining periodical press.

As regards the transportation, storage and use of explosives, it requires to be said that there is as yet no general and consistent conformity to the rules and regulations promulgated by the United States Bureau of Mines and the State Industrial Accident Commission. There is the usual indifference to risks common to the mining industry, and absolute safety is often a secondary consideration. There is perhaps no direction in which effective state supervision is likely to be productive of better results except that even more is to be expected from the voluntary enforcement of rigid discipline on the part of the mining companies and the miners' union. The neglect of safety precautions, according to my own experience, in transportation, storage and firing, is common with underground officers and employes. The conditions under which mining must be carried on, however, unquestionably contribute substantially towards this

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end. It would not be advisable to carry safety precautions to the extreme, but on numerous occasions I have observed obvious neglect and indifference for which no reasonable excuse could be advanced.

Another common neglect underground is protruding nails and spikes. The importance of small wounds is gradually being recognized even by the most ignorant underground employes. In this respect the tentative mine safety rules are inadequate. It should be made the duty of every underground foreman to see to it that all protruding nails are immediately hammered down. The danger is quite considerable in dark stopes, where planks from scaffolding are left lying about, and in my own experience several serious accidents occurred with regard to which it could only be said that the immediate cause was gross carelessness. Furthermore, as a rule there is not the necessary provision for effective first aid. It would seem reasonable to insist that every underground foreman should be provided with a small first-aid package, so as to be able to furnish immediate antiseptic protection for small wounds. I have seen wounds treated in the most crude and reckless manner, with a practical certainty of infection. In this respect, also, the tentative mine safety rules of the Industrial Accident Commission could be improved.

I can not go much further into the details of conditions which are suggestive of the direction in which a required improvement can be realized without much difficulty. As I said before, there is so much that is commendable that the shortcomings are of secondary importance. One important aspect of the mining industry is the satisfactory housing of mine employes. The conditions in California in this respect are distinctly above the average and in marked contrast to the mining camps of Nevada. Attention may be directed to the admirable treatise on houses in mining towns, by John H. White, published last year by the United States Bureau of Mines. The principles of housing and community life laid down in this outline are, in the main, conformed to in the mining communities of California, and particularly so in the Grass Valley. I recall nowhere a more beautiful section where the problem of housing, in the sense of a genuine community life, seems to have been solved in a more satisfactory manner. All modern welfare work includes the three factors of safety, sanitation, and comfort. In the ultimate solution of the labor problem the attainment of satisfactory housing and home conditions will be found of the first order of importance.

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The conditions at Grass Valley and Nevada City in this respect are almost ideal, in contrast to the deplorable indifference and neglect in housing and home life in the Pennsylvania coal-mining districts, and of course in many other mining sections of the country. The conditions at Grass Valley and Nevada City challenge favorable comparison with any other mining community in the world. These two localities prove that the social and economic level of the mining industry can be raised to that of a thoroughly well ordered community, with a due regard to all the essentials of a wholesome and progressive community life. On the Mother Lode the conditions are not so satisfactory. The underground conditions are more serious, and the existence of miners' ankylostomiasis is a menace to the miner and his family which urgently demands the more qualified consideration of the Federal Government, the State Board of Health, the State Industrial Accident Commission, and the medical profession. Miners' ankylostomiasis, apparently, has gained considerable headway in the deep and moist coal mines of the Mother Lode. The work by Dr. Gunn, of San Francisco, and his associates, is deserving of sincere appreciation, for, after all, the recognition of an evil in its incipiency is infinitely more valuable than the ultimate cure of a disease after many serious losses have been sustained. I entirely agree with Dr. Gunn, that the local situation calls for further consideration, and it is sincerely to be hoped that, in co-operation with the State Board of Health, and the United States Bureau of Mines, as well as the State Industrial Accident Commission, an early and exhaustive investigation will be made.

The problem of miners' phthisis is still more serious. The precedent set by the Transvaal Chamber of Mines in calling upon Dr. William C. Gorgas, the former chief sanitary officer of the Isthmian Canal Commission, and now the surgeon-general of the United States Army, to investigate the local situation on the Rand, indicates the direction which a corresponding investigation should take in this country. The lamentable conditions disclosed in the Joplin mining district by the United States Bureau of Mines indicate that the problem can not be solved by superficial considerations. The report of the Miners' Phthisis and Pulmonary Tuberculosis Commission, of the Union of South Africa, published in 1912, contains a well defined outline of the direction which a thorough investigation should take to disclose the existing evil to its fullest extent. The annual statistics of the California State Board of Health substantiate the conclusion that there is much more miners' phthisis in

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California than is generally assumed to be the case. There are reasons for believing that in some sections of Nevada the conditions are even worse. Now that workmen's compensation is made to include occupational diseases, there are the most urgent reasons why this question should receive adequate but strictly scientific consideration. My own investigations, including interviews with individual miners, medical practitioners in the mining region, and mine managers of long experience, substantiate the conclusion that miners' phthisis in certain deep mines of California and Nevada is a practical question which urgently demands consideration. It requires to be said, however, that something is being done to check the frequency of the disease, and it is gratifying to find that there is now less reluctance on the part of the men to spray the stopes, and even to use respirators in particularly dusty raises, than formerly. In this connection I may also refer to the increasing practice of medical examinations of mine employes as a condition precedent to employment. In the case of one large mine in Nevada one thousand men were examined thoroughly, with the inclusion of the Wassermann test, for venereal infection, without any serious difficulty whatever. An even more thorough investigation was made in South Africa, where a much larger number of miners were examined, with the result that quite a number of incipient cases of miners' phthisis were ascertained in time for suitable sanatoria treatment. It is sincerely to be hoped that this practice will be further perfected and made much more general, and that the hearty co-operation of the miners will be enlisted in an effort primarily designed for their own protection.

In the case of quicksilver mining, it appears that conditions have very much improved. With the abandonment of the mines in which the metal occurred in its native state, the incidence of mercurial poisoning in mining has practically been eliminated. In the various reduction processes, however, cases still occur, and the question remains one of much scientific interest. As a matter of practical experience, however, it may be said that serious cases of mercurial poisoning in cinnabar reduction plants are relatively rare, but there are reasons for believing that the application of the workmen's compensation act to cases of this kind will bring forward evidence that neglected treatment is likely to result disastrously in the case of the more ignorant labor class from Mexico and elsewhere. It may be pointed out in this connection that experience seems to show a rather close relation between habits of gross intoxication and in-

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creased liability to mercurial poisoning, and that with the passing of the former evil the incidence of the disease has diminished proportionately in frequency. Furthermore, it may be said that the employment of more qualified physicians at the quicksilver mines has provided the means for the effective treatment of light cases of salivation, so that the more serious forms of mercurial poisoning are now quite rare.

Cyanide poisoning in a fatal form is practically unknown, regardless of the large increase in cyanide practice throughout the mining districts. At most of the plants rules are posted regarding first aid in the case of cyanide poisoning, but it would seem important that these rules should be revised and made more immediately applicable to cases of exceptional emergency. The rules now posted are those gratuitously provided by a manufacturing concern of Denver, derived from foreign sources. The first-aid outfit of cyanide antidotes is in many cases old and neglected, and in some cases not as conveniently available as would be desirable. It would, furthermore, seem of some importance that someone should be thoroughly well instructed in the required treatment in the absence of a qualified physician. The cases that occur are so rare that it is obviously a rather difficult matter to keep the subject in mind, and to have someone familiar with the method of administering the antidote, but under given conditions neglect in this respect may involve loss of life, or in any event prevent serious bodily injury. It is to be hoped that the United States Bureau of Mines and the State Industrial Accident Commission will give this matter practical consideration.

It has not been possible for me to examine carefully into the labor conditions of the smelting industries, but such evidence as I have been able to obtain indicates that a large amount of preventive work has been done and that there has been a material reduction in the incidence of lead-poisoning. The forthcoming elaborate report of the Selby Smelter Commission will provide a thoroughly well considered basis of fact and opinion concerning the health-injurious aspects of smelter-smoke and smelter-fume exposure in the furtherance of corresponding investigations made in Montana. My own observations and conclusions are quite favorable, and I am not aware of any facts tending to prove that, aside from the general risk of lead-poisoning where safety precautions are neglected, and the occasional risk of arsenical poisoning where there is undue and reckless exposure, employment at smelting plants is seriously, if at all, injurious to general health. This conclusion applies specifically to the

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almost universal but slight exposure to sulphur dioxide. Progress has been made in the gradual elimination of cases of lead-poisoning in lead refineries, and reference may here be made to the very useful and practically conclusive investigations made under the direction of the U. S. Bureau of Labor, by Dr. Alice Hamilton and others. In this respect, also, the evidence is quite convincing that the incidence of lead-poisoning and other forms of industrial poisoning is, to a marked degree, influenced by habits of gross intoxication, and that the individual liability of idiosyncrasy is, in a measure, a question of habits, also otherwise detrimental to physical efficiency.

The foregoing observations quite inadequately reflect the results of a rather arduous and exacting inquiry made only for insurance purposes and which, however extensive, fall far short of the required degree of finality and completeness from the practical mining point of view. The investigation was primarily made for the purpose of determining underground conditions, with reference to the risk of exposure on the part of mine employes, and in the main the conclusions are to the effect that these conditions have, within recent years, undergone a material improvement, and that the liability to fatal and serious accidents has diminished, and may be expected to further diminish in the near future. The progress which has been made reflects in an admirable manner the efficiency and humanity of mine management in California and Nevada, but the conclusions apply chiefly to the larger mines, which, for obvious reasons, alone have been included within the scope of my own investigation.

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The Future of the American Zinc Industry.

BY OTTO RUHL,

JOPLIN, MO.

Eighteen months ago many of those engaged in the zinc industry would have said there was not very much of a future for the industry. The general stagnation of the business of the country, especially in steel and iron, had been piling up a huge surplus of metal at the smelters and the miners had curtailed output and piled up a surplus of zinc concentrates that could not be marketed profitably. A revision of the tariff had been made which took away the protection that had been afforded the American miner, save a mere nominal 10 per cent ad valorem tax. The smeltermen had their protection cut in half. The whole industry was in the dumps and anyone who would have predicted anything of a promising nature for the immediate future would have been promptly discountenanced.

No one expected a higher market level for spelter than five cents, while many predicted four cents. When the price of Joplin zinc concentrates fell below $40 per ton, it passed below the general average cost of production and was naturally followed by the usual result. The Joplin district with hundreds of mines saw them shut down by the dozen at a time. The western States' zinc mines were also in the same position in many cases and they, too, either curtailed output or stopped production. Yet out of these conditions came sudden prosperity and such prosperity as had never been anticipated in the dreams of the most optimistic.

Unfortunate from a purely humane standpoint, but certainly providential to the American zinc miner, has been the continuance of the revolution in Mexico. Had Mexico become tranquilized, Mexican zinc ores would have displayed 60,000 to 100,000 tons of American zinc ores following the heavy reduction in the tariff made in the Underwood Tariff Bill. But instead, the revolution has acted practically as a prohibitive tariff and American zinc miners have been spared that competition.

Then came the upsetting of the world finances and trade conditions from the European war, and out of that terrible conflict has come the greatest prosperity in the history of the zinc industry.

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With Beligum overrun by the Germans, the only source of supply for this necessary metal in munition manufacture for the Allies was the United States, and on account of their demand for high-grade spelter, prices for zinc advanced rapidly to undreamed-of heights. It is difficult to believe that ordinary spelter could go from five cents to 28 cents and fancy grades even up to 44 cents per pound, but these things have happened, and have been prevailing for the past year. It is in view of these new conditions that have arisen and of the modification of old settled conditions that a look into the immediate and more remote future may prove interesting if not profitable to the zinc industry.

Perhaps a few of these changes, many of which this assembly already has knowledge, may be hurriedly sketched in a systematic way to form the warp for the texture of this discussion. These changes may be sketched to best advantage under three heads, viz., Mining, Smelting and Trade Conditions.

The effect of these changes on the Joplin mining district, the largest single producer of zinc ores in the United States and the largest producer of high-grade concentrate in the world, forms an interesting chapter in current history. The demand for spelter of the grade necessary for making brass for munitions naturally fell to those concerns whose product came principally from the smelting of high-grade zinc concentrate. The effect of this demand was felt on the Joplin market immediately after the declaration of war and the overrunning of Belgium by the Germans. England needed spelter, and, finding it impossible to obtain it from former sources, turned to the United States. Prices for concentrate jumped from $38 and $40 to $50 per ton in Joplin; and thus began one of the greatest eras of production the Joplin district has ever known.

Following the long period of low prices in 1913 and in the first half of 1914, there had accumulated in the bins of Joplin producers surplus stocks amounting to 12,000 to 18,000 tons of concentrate. Simultaneously the rate of production had fallen to approximately 5,000 tons per week, the major portion of which was coming from the smaller mines and richer ore deposits, from which profits could still be obtained, even in the face of low prices. The large "sheet-ground" areas were full of idle mines and mills; and these were the properties, too, from which come the large weekly outputs. Another singular condition was the fact that in the thin sheet-ground areas there were still standing some of the mills that had become monuments to the failure of concerns that had attempted to work

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ground containing less than 2 per cent zinc. On a $40 market they were colossal failures; with a $75 market they offered opportunities for quick and large profits, because the development work was all done underground and the only expense was the repair to the plants before production at capacity was possible. As the zinc smelters turned to the Joplin district for their needed supplies of high-grade concentrate, they found there large surplus stocks to draw upon, a steady weekly output of 5,000 tons, and, with an increased price, a potential output of 1,200 to 2,500 tons weekly.

The rapid increase in demand for "brass-special spelter" soon used stocks of high-grade concentrate held by most of the smelting concerns, and caused those whose products had been confined to ordinary grades from mixed and low-grade concentrate to change their practice to turning out a better quality of spelter. Some smelters that had been taking large tonnages of low-grade concentrate restricted their contracts to the minimum, accumulated product in stock-piles, and began the purchase of high-grade concentrate and the manufacture of spelter suitable for brassmaking. This action again was reflected in the Joplin district by an increased demand, and prices began to soar above the $100 level.

In addition to the desire for concentrate of high grade for making a good brand of spelter, the desire for maximum capacity on the part of the smelters led to the increased demand for Joplin 60 per cent zinc concentrate. A zinc silicate or carbonate product must carry 40 per cent to be acceptable, while a sulphide carrying less than 50 per cent is not being sought. Thus while many western mines capable of producing a large tonnage of 40 to 50 per cent zinc concentrate were finding that they could not market their product, the demand upon the Joplin district was constantly increasing.

Responding to this demand, the Joplin district during the first six months of 1915 has shown a weekly production of 6,230 tons of zinc concentrate, equivalent to 325,000 tons annually. Of this, nine-tenths is sulphide that will average 57 per cent zinc, and the remainder calamine that will average 40 per cent. This shows an increase of approximately 20 per cent in output for the half year. It is safe to say that the momentum of increased activity due to increased demand and prices is just now at the point where it is being most felt, and the results are certain to be made more manifest in the second half of the year.

Practically all the mines in the "sheet-ground" that are normally classed as going concerns at normal prices of $40 to $45 for

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concentrate are now working at full capacity. Every "soft-ground" property capable of production at normal prices is also working at full capacity. When it became certain that the period of high prices had come to stay for the period at least of the war, those "sheet-ground" mines, previously mentioned as "colossal failures," but now potential profit makers, received attention. They are beginning to show in the production columns and before the year ends there will be a much larger list of active properties of this class. Their life, of course, will be confined to the period of high prices.

The early demands for ore naturally fell to the Joplin district, and other districts suffered neglect except where ores were contracted. The operating mines of Idaho, Montana and Colorado pressed their outputs to the maximum, but the restrictions on low-grade ore purchases were so severe as to discourage idle western mines from reopening where they were not able to produce at least a 50 per cent zinc concentrate. Wisconsin, with its concentrates carrying heavy iron pyrites, sent its products to magnetic separating plants to eliminate the iron and raise the zinc content, and this tendency has caused the erection of a number of such plants and increased the capacity of the old ones in that field and has permanently placed it in the class of high-grade camps. But throughout the country the interest in zinc mining is intense and there is under way a potential production of zinc ore that promises surprising tonnages before many months.

Smelting Conditions.

Zinc smelting showed just as much activity as mining. Idle and abandoned smelters have taken on a new lease of life under the stimulus of ten to twenty-five cent spelter and every statistician in the country has been going round in circles trying to revise his tables of smelting capacity to fit the daily advices of reopened plants, new additions and announcements of entirely new plants. According to the Press Bulletin of the United States Geological Survey issued September 9, Mr. C. E. Siebenthal estimates the zinc retorts in commission at 130,642 on June 30, as contrasted with 113,914 on December 31, 1914, or an actual increase of 15 per cent. From the production tables, however, it appears the output of spelter for the first six months of 1915 was 216,532 tons, as compared with 177,991 tons the previous six months, an increase of 21 per cent in the metal. Mr. Siebenthal also reports under construction or planned for early construction 34,048 additional retorts. This means an increase of retort capacity of practically 50 per cent by the end of

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1915. Of this large increase in the retort capacity, it must be remembered that a very large part of it lies in the old Kansas gas belt and the Kansas coal belt in the rehabilitation of plants long idle and antiquated and whose cost of production means the closing down of the plants so soon as spelter assumes anything like the level that prevailed eighteen months ago. It represents emergency capacity and when spelter again reaches seven cents or under, that capacity will drop out of commission. The remainder of the new capacity consists of additions and new plant construction in permanent smelting centers and will have to be reckoned with in any price conditions that may prevail for the metal in the future.

Trade Movements of Zinc.

A few words about the trade movements of zinc and the data available as to consumption of the metal and the three factors of the industry for weighing in the future will have been set forth. The apparent domestic consumption of zinc was 160,906 tons for the first six months of 1915, or 11,000 tons greater than the previous six months. Our exports, both domestic and foreign, totaled 70,326 tons, as against 72,496 tons the previous six months. It would appear from recent figures that the exports of zinc as metal are growing smaller from month to month, while goods manufactured from zinc, brass, etc., are increasing. In view of the generally known conditions of the world's business at this time, it would seem fair to predict that the consumption of zinc for the last six months of 1915 both for domestic use and for export will equal but not greatly exceed the first six months of the year. That will mean a total consumption of 465,000 tons of spelter that will have to come from smelting zinc ores. This leaves out of consideration the production and consumption of secondary spelter coming from the treatment of drosses, skimmings, old zinc, etc., which usually amounts to 50,000 tons, and will probably this year be augmented to 60,000 to 65,000 tons.

With these basic facts laid out, we may examine the relationship of the various factors which will determine the future. An examination of the proposed consumption of zinc in relation to the possible capacity of the smelters to supply it will be undertaken first. As noted, the first half year of 1915 yielded 216,532 tons of spelter from 130,642 retorts, or at the rate of 3.2 tons per annum per retort. These same retorts will be in commission the remainder of the year and by the end of the year the United States Geological Survey estimates 34,048 more retorts will have been added to them.

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It is very doubtful if these will be added early enough to make more than 50 per cent of their scheduled capacity for the period. But granting that they do operate to capacity for 50 per cent of the period and at the rate of 3.2 tons of spelter per year, we should have an increase of 27,200 tons of metal, which, added to the remaining output, makes a total smelter output of 460,265 tons, or within 5,000 tons of the estimated total consumption for the year. This is more than made up by the amount of spelter stocks reported at the end of June.

According to Mr. Siebenthal's estimate in the United States Geological Survey's Press Bulletin of September 9, it is not likely that the retorts actually in commission turn out much more than 3.5 tons of spelter per annum at the present time. That conviction is based upon investigations of the Survey in 1908 and upon observations and deductions from known changes in the condition of ore supplies and the spelter content in more recent years. This estimate is strongly upheld by the results shown in the first half of 1915. The rate of production shows an average rate of 3.2 tons per annum or retort. It should be recalled to mind that this period has been one in which smeltermen have crowded the capacity to the very maximum, due to the desire to take advantage of the high price of metal. The restrictions in buying ores so that no sulphides under 50 per cent were taken shows how the policy was kept up. These restrictions have been just as rigidly enforced as conditions of previous contracts would permit. This being true and with smelters buying high-grade Joplin and Wisconsin ores and combing the country for this class of ores exclusively, the first half of the year must have seen the very maximum of retort capacity obtainable. There is little possibility of any further increase in retort capacity because the ore supplies to be drawn upon, either domestic or foreign, will not be so high grade nor contain so large a percentage of zinc as have the ores of the last half year. The tendency for capacity should therefore be downward.

Another factor that will act in the direction of a lower average output per retort is the larger relative proportion of higher grade spelter demanded at this time as compared with previous years. The increase in the demand for brass special spelter has been unusual, while galvanizing, which has hitherto taken the greater proportion of spelter and was content with ordinary grades, has had a direct falling off. It is very probable therefore that a considerably larger number of retorts will be engaged in retreating prime western

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grades to bring up to the brass special grade than has ever prevailed before.

It would seem in the light of these conditions that there has been a somewhat exaggerated idea of the possible increase in spelter output. If anything may be inferred from these facts it seems certain that in spite of the almost miraculous increase in retort capacity during the year, it will not more than suffice the probable consumption for the year.

Just here it may be pertinent to inquire how long we may expect the present demand for spelter to keep up. We may safely believe that there will be no diminishing of the demand for zinc nor much change in the character of the demand during the period of the war. What that period will be, no one knows. What will happen to our industry after the war depends upon three things: the condition of the smelters and the number of skilled smelting workmen left alive in Belgium and Silesia; the ability of the European peoples to begin new construction work and to pay for the material; and the ability of the American zinc industry to hold the foreign trade formerly held by Belgium, Germany and Great Britain. None of these factors can be determined at this time, but it is certain that Americans that have built up a $100,000,000 zinc export trade will fight hard to retain it and will certainly hold a very large proportion of it for many years.

Domestic Ore Supply and Consumption.

The relation of domestic ore supply and the consumption of zinc is succinctly set forth by Mr. Siebenthal in the spelter bulletin of the United States Geological Survey issued March 25, 1915. He says:

"The average yearly increase in recoverable zinc content of domestic ore for the period 1907-1913, inclusive, is 26,405 tons. No figures are available for the zinc content of ores mined in 1914. Adding the average yearly increase for two years to the output of 1913, we get 471,192 tons as a normal estimate of the output of domestic mines for 1915. Adding 10,000 tons as probable imports in ore, and subtracting 70,000 tons as probable zinc content of pigments, we get 411,000 tons as the probable zinc in ore available for spelter in 1915. To this should be added the 20,000 tons of spelter stocks on hand at the beginning of 1915, making 433,000 tons available. It will be observed from the table above that the total recoverable zinc available for spelter for 1907-1913 was about 66,000 tons in excess of the actual production of spelter for the same

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period. This is to be accounted for as increased ore stocks at the large new smelters, oxide plants, and separation plants which have been built since 1907, and is in large part available for immediate consumption. Adding this to the 433,000 tons, we should have roughly 500,000 tons supply available for treatment in 1915. To this there is to be further added the production of secondary spelter, which reached 52,251 tons in 1912, and could no doubt be expanded to 60,000 tons or more if the occasion arises. So that if the United States is called upon in 1915 for the possible supply of 594,000 or even 600,000 tons of spelter, the zinc will be probably at hand without increasing the mine production above the normal, to furnish nearly 560,000 tons of it. The remainder would easily be supplied by increased production from Montana, Idaho, Colorado, New Jersey, Tennessee and other States, under the stimulus of high prices. In the Joplin district alone much lean sheet-ground territory not recently operated would become productive under continued high prices, to say nothing of increased production from operating and new mines."

Since this was written two-thirds of the year has passed and it is now evident that the demand for spelter from ore as already pointed out will not exceed 465,000 tons.

In this connection it should be recalled that in the early sketching of mining conditions it was pointed out that western zinc ore producers had found difficulty in marketing their ore, and it is still difficult to do so for some grades. So what stands out beyond any question is the ample supply of domestic zinc ores to meet the possible or probable consumption for 1915 or for some time to come.

But while the world is buying spelter and zinc manufactures in huge quantities from America and our zinc smelters have no competition for their product whatever, our American zinc ore producers have no such sinecure. Australia with its European market gone stands ready to ship to this country 300,000 tons of zinc concentrates per year. The imports from Australia received and contracted for already total 78,000 tons. Only last month I was importuned to assist in the marketing of 25,000 tons of Spanish zinc ores here per year. Mexico has already shipped in 27,000 tons and with peaceful conditions is ready to ship from 75,000 to 125,000 tons per annum. Canada is shipping to us so long as spelter is high.

How great is the interest in importations of zinc ores by American zinc smelters is shown by the number of smelting concerns

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which recently jointly met with the Treasury Department in asking a certain set of standard specifications be adopted upon valuing zinc ores imported into the United States. These smelters represented a very large percentage of the smelting capacity of this country. It thus becomes immediately evident why the price of zinc ores, and especially low-grade zinc ores, are not on a parity with spelter prices, and why some of our western zinc ore producers have not been able to even find a market for their product. That the United States is facing a period of very large zinc importations admits of little doubt.

Still another feature of great interest to the American zinc miner lies in the character of zinc and zinc manufacture that will make up our exports. So long as the demand is limited to zinc suitable for brass manufacture and munitions, the exports will be made up principally of American spelter made from American ores, for it is the high-grade, pure American ores that are suitable for making these brands without recourse to melting and refining practices. On the other hand, exports of zinc for galvanizing and galvanized products will likely be made up from imported ores from which the manufacturer can secure ordinary spelter easily and from cheaper ores and at the same time get his duty rebated when he re-exports his products. That this latter course will be extensively followed and become a growing feature of our foreign export trade seems certain with such large supplies of foreign ores to draw upon.

The action of the American Steel and Wire Company in building a new zinc smelter of 40,000 tons capacity near Pittsburgh is also a feature that foreshadows a change in the future of the industry. While this concern has for years been interested in zinc smelting through its subsidiary, the Edgar Zinc Company, this additional capacity is noteworthy in that it takes out of the general market for spelter the heaviest single consumer and henceforth it will become a buyer of ores instead of the finished product. It is interesting to note here that in the expanding trade in steel, wire and sheets, this company is playing a leading part, and that it is likely to use foreign ores in its smelters and use this spelter in its exports is only the part good business would be expected to play. In fact, the Edgar Zinc Company, its subsidiary, has just closed a contract for 50,000 tons of Australian ores.

It is therefore going to be increasingly difficult for American producers of low-grade zinc ores or such grades as are similar to those now possible of importation from Australia, Mexico, Canada

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and Spain to sell their ores for prices in proportion to the prices paid for spelter or even high-grade American zinc ores.

Summary.

To sum up, it would appear that the present and immediate future of the whole zinc smelting industry is, and will be, prosperous, and that it is reasonably certain that for a number of years America will have a very large share in the export zinc trade of the world.

In the second place, the producers of high-grade zinc ores have now and will continue to have a comparatively prosperous future for their product.

The outlook for the producers of low-grade zinc concentrates is not so bright. They will have to be content with receiving prices for their ore on a par with what low-grade foreign ores can be purchased for until such time as a revision of the tariff is made that will give protection or there is such a reconstruction of the world's trade as will turn foreign ores to other countries. In the meantime their only recourse is to reduce the cost of production and strive to bring up the grade of their product, a thing that the Wisconsin ore producers have already done and it is an example for other low-grade camps to follow.

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